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DIVERTICULITIS AND DIVERTICULOSIS

JOHN F. ERDMANN, M.D.
NEW YORK

In the male, pain in the left lower quadrant, with nausea or vomiting, predicates diverticulitis of the sigmoid; in the female, in whom this disease is of relative infrequency, it may mean any one of numerous diseases.

Since 1919 I have operated on seventy-one patients for acute diverticulitis, of whom fifty-six were males and fifteen were females. Carnial stated that there are two or three cases in the male to every case in the female. Of my series, several patients had had multiple attacks. One had had two distinct perforations during a period of thirteen or more years, for each of which he was operated on; the others had had two attacks, for which they had been operated on. The gangrenous perforations in each patient were in demonstrably different areas.

I [1] called attention in 1918 to the possibilities of repeated attacks. My associate at that time, Dr. Thomas Russell, also has found a second perforation in one of his patients, remote from the site of the first attack.

These succeeding gangrenous attacks will, of necessity, call for a very guarded prognosis as to the future. Prompted by the number of patients I have seen and operated on for the acute condition, I feel no need of apologizing for again reviewing the literature as to causation and expressing my individual views derived from clinical observations.

CAUSATION

Much has been said as to the origin or cause of these protrusions. In searching for a reasonable cause for diverticulitis of the intestine, I am led to cite Edwin Beer,[2] whose paper stands out as one of the best expositions of this disease. It is furthermore remarkable with what foresight Beer, in 1904, announced his hypotheses as to the terminations. Among the contributors to the pathology, causation, and other aspects may be cited Graeser, Sudsky, Klebs, Hartwell and Cecil.

Graeser assigns the cause of the formation of diverticula to hernial protrusions, which follow the emerging veins and after taking a wandering course through the intestinal walls finally reach the serosa. These conclusions are based on twenty-eight cases, from which he made more than a thousand sections.

Sudsky made a series of observations, contending that those of Graeser were at fault, being chiefly accidental.

Klebs noted that the protrusions occurred in close relation to points of exit and entry of the blood vessels in the intestine along the mesenteric attachment and offered a series of arguments for these protrusions, chief among them being that the intestinal wall is weakest at the mesenteric attachment.

I am satisfied that the argument of Klebs is fallacious, for in my series of patients, both those operated on and those in whom these protrusions were found inactive while I was operating for other causes, the most frequent site was that of the convex and lateral aspects of the colon, chiefly in the fat lobules or epiploons, and rarely in the mesenteric folds. Further, the view of Klebs regarding mesenteric traction acting as a tendency to weaken the wall, thereby being a productive factor, appears to me to bear little weight. Old age as a factor is disproved by Ashhurst's patient, a boy, aged 7, two patients of Hartwell and Cecil, aged 7 and 10 years, one of my own, a boy under 7 years, and a number of the patients used as material for this article, under 40. Ransohoff [3] reported the occurrence in two children and called the condition perforating sigmoiditis and perisigmoiditis.

Finally, Hartwell and Cecil in summing up the etiology of this disease, after considering the various theories and arguments, apparently were forced to make the following statement: "We, therefore, are driven to the conclusion that up to the present time no complete explanation of the primary cause of intestinal diverticula had been offered. The most that can be said is that for some cause a weakness exists in the intestinal coats, and that by reason of the weakness a pouching of the coats takes place when undue pressure arrives." I am inclined from my clinical experience and from roentgenographic observation to the conclusion that they are of congenital origin.

Reference to the literature and my own observation produce sufficient evidence of the fact that the entire alimentary tract from the esophagus to and through the rectum is liable to diverticula. During the past eight years I have operated on several patients who had diverticula other than colonic. Among these were six or more duodenal, one gastric, several of the gallbladder and numbers of the appendix; one of the appendicular operations was on a child under 7 years of age. Also many instances have been observed, during various abdominal operations, of diverticula scattered through the lesser as well as the greater intestine.

In the patients with acute manifestations, some food or fecal content is often found in the pouch involved,

Read before the Mid-South Post-Graduate Assembly, Memphis, Tenn., Feb. 9, 1932, and the Southeastern Surgical Congress, Birmingham, Ala., March 7, 1932.

1. Erdmann, J. F.: Acute Diverticulitis of Colon, New York M. J. 109: 969 (June 7) 1918.

2. Beer, Edwin: Some Pathological and Clinical Aspects of Acquired Diverticulitis of the Intestines, Am. J. M. Sc., 1904.

3. Ransohoff, J.: Acute Perforating Sigmoiditis in Children, Ann. Surg. 58: 218, 1913.

leading one to believe that these foreign bodies act in the same productive manner as do the foreign bodies that are found in the appendix.

Diverticulosis is a condition in which many diverticula are found either by operation or by roentgen examination and today is a well established disease, at least roentgenologically if not symptomatically or clinically, and requires but the onset of a pathologic process of one or more of the protrusions to become a definite clinical entity.

CLASSIFICATION

While various classifications as to false and true, acquired and congenital diverticula have been in vogue, that of true diverticula, in which all coats of the intestine are present and the false diverticula, when one and usually two coats are absent, are the most popular and desirable for a working basis.

PATHOLOGY

The pathologic conditions found may be of the same varieties as there are types of appendicitis, from a simple catarrhal, better called acute type, to the types

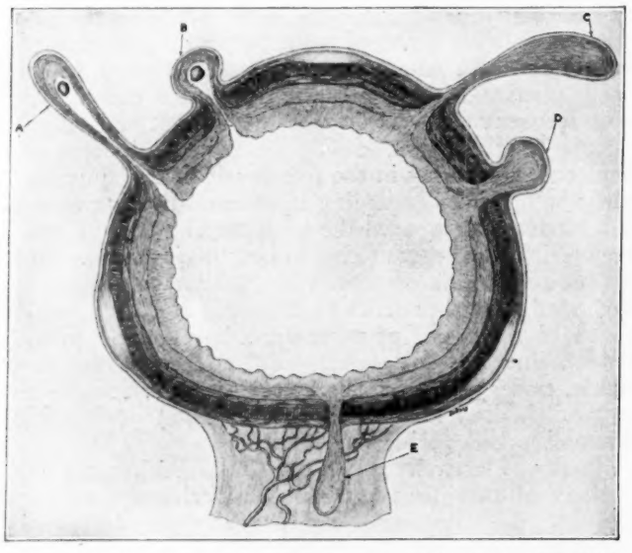

Fig. 1.—Various forms of diverticula: *A*, true diverticulum in epiploic appendix with foreign body; *B*, true diverticulum with foreign body; *C*, false diverticulum in epiploic appendix; *D*, false diverticulum; *E*, intermesenteric diverticulum.

of exudative and occlusive changes and of ulcerative to gangrenous and perforative evidence. These may or may not all be accomplished by or, rather, followed by exudate to true abscess formations, and finally the acute processes may recur or never resolve and a malignant change eventually may arise. These malignant changes are reported frequently enough to give some weight to the possibility of an implantation of a malignant nature on a former simple inflammatory growth. Nevertheless, even though in my series of patients with this disease I have found a malignant condition in six or eight, I can only feel that it is not a result of the disease but a coincident condition, reserving the thought that the malignant implantation at the site of a prolonged irritation is always possible.

In many of these patients there exists a low grade infection proceeding finally to a marked thickening and new growth, which at first will resemble a malignant growth in its symptomatology as to partial or complete obstructions and roentgenographically be so confusing at times as to demand exploration for a positive diagnosis by the microscope. One of the most frequent complications in the acute types is abscess formation, with adhesions to a hollow viscus and perforation. This occurs most frequently in the bladder. I have seen this complication in several patients in my operative series, and in one patient not only was the bladder perforated but a contact portion of the sigmoid was perforated and two perforations of the ileum also were present.

Recently I saw a patient on the eleventh or twelfth day of his disease, with a one-half inch perforation into the posterior wall of the bladder, passing a most foul fecal-mixed urine. On exposure by operation on the fourteenth day of his disease, two perforations in the sigmoid were in contact with the bladder perforation.

On three or four occasions I have seen high perforations in the rectum which produced ischiorectal abscesses, the origin of which in each, I feel satisfied, was from a gangrenous diverticulitis. Several patients had a history of sudden onset of pain with the subsequent formation of the abscess.

That nonoperative recovery takes place at times in these patients cannot be disputed any more than in patients with appendicitis definitely evidenced by symptoms but who also make the positive nonoperative recovery. Early in 1926 I removed ten inches of the sigmoid in a man, aged 54, whom I saw three years before in an acute but subsiding attack and who has been seen at various times during these three years by his family physician for mild attacks. His fourth attack, which required operation, was followed by a large mass formation in the left lower quadrant, encroaching on the hypogastric zone, and on exposure not only was a marked amount of thickening and obstruction evident but three large pockets of foul pus were evacuated. During the past five years I have removed various lengths of sigmoid for these conditions, one in a woman, aged 74, who also had an incarcerated femoral hernia.

SYMPTOMATOLOGY

Formerly it was believed that an appendicular attack occurred in the left side as the result of the terminal portion of the appendix extending across to the left, or that there was a transposition of the appendix with infection. While these cases—particularly of the former type—do occur, it has been possible for years in the greater number of instances to diagnosticate these involvements definitely as diverticulitis.

The symptoms and signs are allied to the various types of appendicitis, such as the fulminating, in which pain in the left lower quadrant rapidly spreads over the abdomen, the pulse and temperature keeping pace with the invasion, abscess formation as in appendicular abscess, definite pain on pressure, and finally mass or tumor formation. Eventually, if operation is not performed, the following terminations are in order: resolution (occasional), perforation into a surrounding viscus (the bladder most frequently), ischiorectal abscess and, in the event of nonresolution or nonoperative intervention, thickening of the intestinal wall and surrounding fat, so that obstruction of varying degrees results.

In the fulminating type, it may be that one must take refuge in the diagnosis of an acute condition of the abdomen and explore. The diagnosis in women, as stated before, is difficult at times, owing to the presence of the tube and ovary and many diseases of these two structures, which are closely allied in their symptomatology to acute diverticulitis.

In the subacute variety there frequently occurs a state of subsidence which enables the x-ray diagnostician to

be of assistance. In the very low grade type with marked infiltration, the patient presents the occasional evidence of obstruction in mild or incomplete form, with no evidence of blood or mucus as in carcinoma. With a proctoscope up to its length one can eliminate carcinoma at least in those patients in whom carcinoma starts in the mucosa, recognizing the fact that only a minimal number of cancers of the sigmoid or colon ever arise outside the mucosa. Nevertheless, I have no recollection of ever having seen the mucosa of the colon involved in a case of diverticulitis. The obverse obtains in malignant conditions. I can think of no more difficult bit of work than of seeing through a proctoscope the openings of any of these diverticula, yet can conceive of the accidental exposure of a relatively small opening or of the opening into a large diverticulum in which the mouth is also large.

DIAGNOSIS

In making a diagnosis of this condition, the general aspect and the age of these patients are to be considered. The majority are short, stocky beings, well nourished and of the overweight make-up, usually in the fourth or fifth decade, and giving a history of some dietary indiscretion, as is also so often noted in taking a careful history of appendicitis. The youngest of my patients was under 7 years of age and the oldest 81, both male, while the majority were from 40 to 48.

The onset is characterized by pain in the abdomen, which is more definitely located, early, in the left lower quadrant than is the localization in appendicitis. There is nausea or vomiting, temperature and pulse rapidly ascending in the scale, with the concomitant tenderness on pressure in the left lower quadrant varying from the usual iliac fossa area to the midhypogastric zone. The blood examination gives the typical picture of an acute infection. Rectal evidence will vary as to the site of the involvement. If the lesion is high up in the sigmoid, little or none is present, while if located in the lower segment of the colon, ample evidence can be detected, being chiefly pain the first few hours and then a palpable mass. Again, if the area involved is in the midsigmoid area, sufficient mobility being present, one may get the evidence by combined rectal and suprapubic pressure.

The greatest difficulty in making a positive diagnosis prevails in malignant cases with perforation, for in these cases, owing to the perforation, an absorption or infection temperature exists and a tumor or mass in both the malignant case and the infection. A carefully taken history will often bring to light in the carcinoma patient evidence of occasional pain, colic, constipation, loss in weight, blood or mucus in the stool, tenesmus, frequency of desire or pain in the back and may show by blood examination a distinct secondary anemia. When it is possible to use x-rays without danger to the patient, these frequently will be a great aid. The possibility of the two diseases being simultaneously present should be borne in mind.

GROSS PATHOLOGY

When the abdomen is opened, the picture of the intensity of the process varies; noninflamed diverticula are seen protruding from all surfaces or, rather, any surface of the intestine. They are found as balloon-like elevations, resistant to the sense of touch, and may present evidence of containing foreign bodies.

The acutely inflamed type varies from a markedly injected diverticulum or epiploic appendix to one distinctly gangrenous. In the majority of patients on whom I have operated, one or more of the epiploic appendixes were found involved. These tabs of fat, epiploons or epiploic appendixes, were either extremely hard and intensely injected or in varying stages from hemorrhagic to gangrenous involvement. On section of the epiploic variety, near or at the base a diverticulum is usually found. These bodies or pouches are round or oval and range from the size of a small seed to that of an olive, usually being about the size of a pea.

The resected colon, when opened, presents the appearance of a healthy mucous membrane thrown into folds and here and there a crypt or long opening into which probes of varying size may be introduced, some opening readily admitting a probe the size of a small pea. In various pouches round foreign bodies are present, which prove to be fecal concretions. The wall of the colon in chronic cases is thickened, the lumen diminished, and the intestine quite often densely bound to adjacent structures.

McGrath has shown that the majority of the diverticula are of the false variety and that the mucosa is pushed through the muscularis in the region of the

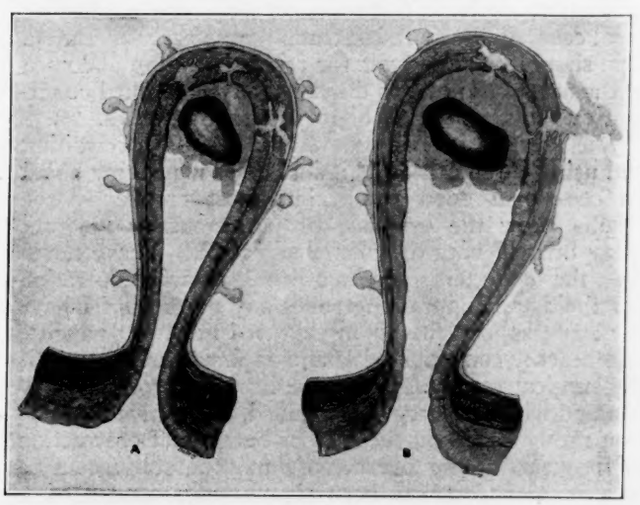

Fig. 2.—*A*, perforating diverticulitis in epiploic appendix; *B*, perforated diverticulitis in epiploic appendix.

penetration of vessels. In sharp contrast to this picture is that of the colon on section in malignant cases. The mucous membrane is destroyed. A deeply excavated area in the intestinal wall exists with hardening of the tissue about it, and the lumen is irregularly compressed by the growth, if not completely annular; if annular, the opening is diminished as the growth increases, similarly to the closing of the diaphragm in a camera. The intestine contains a sloughing, foul-smelling, purulent bloody material. Among the cases (diverticulitis) reported, two were of the cecum, one in the vicinity of the ileocecal valve, and one at the beginning of the ascending colon.

I will again call attention to the statement and fact that operation does not predicate a clean bill of health from occurrence or recurrence of the disease, as in one instance over sixty-four diverticula were demonstrated by me in five inches of a section of sigmoid removed for cancer, while in all the other patients in whom careful search was made numbers of diverticula were found not involved by inflammation. Two of my cases, previously recorded, presenting definite attacks and coming to operation the second time, are also nondeniable evidence of the possibilities of repeated attacks of this dis-

ease. A guarded prognosis as to recurrence is naturally necessary. These two made a 4 per cent record of repeated invasion in my early series.[4] Some of the earlier reports of long cures of cancer by resection must be taken less seriously at the present time and considered as cases of diverticulitis. I can plead guilty to reporting one such case, in which I operated on a woman in 1909 for obstruction supposedly due to carcinoma. The entire pelvis was filled with a hard nodular mass, the temperature was normal, and a complete obstruction existed. A sigmoidostomy was done. In the course of two years, all movements were by the rectum except slight leakage through the now contracted sigmoid anus. The patient was reported well and hearty as late as March, 1925.

PROGNOSIS

In the acute cases with early operation the prognosis is good, while in the chronic cases with resection it is equal to that of all ordinary large intestinal operations of approximately the same severity.

TREATMENT

The acute condition of the abdomen presents but one solution to me in all patients in whom no cardiac or renal contraindication exists, and that is early operation. One should no more wait for resolution in an abdomen in the acute type of this disease than in an allied condition due to appendicitis or to suppurating tubes.

The habit that some operators fall into of waiting and using ice in acute abdominal cases may bring about an occasional good result, but most frequently the results show the evidence of pernicious or ignorant delay or evidences of poor observation. I have never seen the bad results reported in not delaying operation for the acute suppurating tubes any more than I have for acute appendicitis or in ruptured tubal pregnancies, and heartily condemn delay and applaud early action of the surgical variety. When one has the chronic type to contend with no hurry is demanded, as positive obstruction rarely occurs in these cases but partial obstruction is frequent. Here overactivity may be subjugated to treatment, and it has been shown that, instead of a resection, at times an artificial anus proximal to the obstruction will work wonders in allowing absorption to take place in the thickened portion, so that eventually the channel has almost reached a normal condition, whereas, in other instances, resection of a portion will be necessary. Resection is frequently best done and with the lowest mortality by the Mikulicz procedure.

End-to-end suture has a greater life hazard than the former operation, while the side-to-side anastomosis type of operation is practiced only in certain cases.

There are several types of acute cases to consider in the early state. In cases in which mass formation has not occurred, attempts at repair of the perforation are in order and meet with great success; in the acute cases in which abscess exists, liberal drainage and attempts at repair are indicated when feasible; otherwise, liberal drainage only. In the event of partial obstruction, the establishing of an artificial anus proximal to the perforation and obstruction at times works out very well.

A fair proportion of these two varieties of cases after operation may present a fistula for a few weeks or months. The fistula is invariably of small caliber and is easily taken care of and need cause no alarm, for healing is the rule. Several of my patients have gone about a few weeks—one for four years—and eventually all healed. During this time, i. e., between the establishment and the care of the fistula, only an occasional visit to the surgeon, to attend to granulations, is necessary. Multiple fistulas require active intervention.

In the acute variety, which is situated between the plates of the peritoneum in the mesentery, it has been my custom for several years to split the peritoneum on both sides parallel to the vessels in order that freer drainage may occur from the fat of the mesentery, so that a retroperitoneal lymphangitis, the most vicious type of absorption, is diminished.

The behavior of an artificial anus recently in a man, aged 44, with gauze and rubber dam drain, was not so good as anticipated. The patient had chills with fever for days, so that by the seventeenth day a secondary abscess was drained. In the sixth or eighth week a closure of the artificial anus was done and it broke open on the ninth or tenth day. Secondary sinuses formed. Although the patient's chest had been repeatedly examined for tuberculosis, the observations were always negative. A roentgenogram revealed an abscess cavity in the right apex fully two inches in diameter and a dense infiltration of the entire left lung. He had had no cough at any time and very scanty sputum. An examination of the sputum showed that it was loaded with tubercle bacilli. This patient has been sent west to a higher and drier zone. At neither of the abdominal operations was there any visible evidence of peritoneal tuberculosis.

SUMMARY

Diverticulitis is usually a disease of the left lower quadrant but may occur anywhere along the length of the colon and small intestine.

It occurs chiefly in men between 40 and 50 years of age, but attacks in children are reported also.

The patients are usually of the well developed make-up, short, fat and overweight.

About one female to four or five males has this disease.

Operation should be performed in all acute cases, although it is known that subsidence and cure of attacks occasionally take place as in other infective processes.

All chronic cases may be observed until obstructive symptoms show.

DIVERTICULOSIS

Diverticulosis as a disease rarely presents any symptoms sufficiently diagnostic to focus the medical attendant's attention, but in a gastro-intestinal series of roentgenograms this condition is often found and when found is likely to receive slight attention as to prevention of acute attacks. Bargen and Victor[5] have suggested a bland, nonconstipating diet for diverticulosis. Fruits with seeds and of high cellulose content are prohibited, and with these suggestions the subject is dropped. One can but suggest proper attention to the bowels in these patients, being careful not to make the patient conscious of his anatomic or pathologic conditions so as to make a mental invalid of him.

The presence of diverticula in the intestine merits no greater attention than does the existence of the appendix or gallbladder, except that there may be many diverticula, while there is only one appendix and one gallbladder; therefore, ordinarily the chance of acute diverticulitis would be greater, but clinical evidence shows that diverticulitis is by far rarer than disease of the gallbladder or appendix.

60 West Fifty-Second Street.

4. Erdmann, J. F.: Diverticulitis of Colon, Am. J. Obst. & Gynec. **11**: 609 (May) 1926.

5. Bargen, J. A., and Victor, S. M.: Diet in Intestinal Disorders, J. A. M. A. **97**: 151 (July 18) 1931.

STATUS OF COLOSTOMY

DUDLEY SMITH, M.D.
SAN FRANCISCO

Permanent colostomy is essential to success in the operative treatment of cancer of the rectum and rectosigmoid, no matter what type of operation is decided on for the individual case. It is also necessary in other conditions, notably obstruction from diverticulitis of the sigmoid and stricture of the rectum.

Unfortunately, the laity and a large part of the medical profession have an exaggerated fear of colostomy. I have heard doctors in medical meetings say that they would rather die than have a colostomy. When such a statement has been made I have always felt that the person who made it knew very little about a properly constructed colostomy and much less about its proper care. As a matter of fact, a properly constructed, well placed and properly cared for colostomy causes the patient comparatively little inconvenience, and this statement is based on the opinions of a large number of patients who have such colostomies. When I explain to a patient that a permanent colostomy will be necessary, I am in the habit of referring him to one or two patients who have had the operation and are living happy and contented lives. I tell him that these others have come over the trail before him and can tell him precisely how little trouble and inconvenience he will encounter on the way. I rarely have a patient refuse the operation after talking with those who have had it.

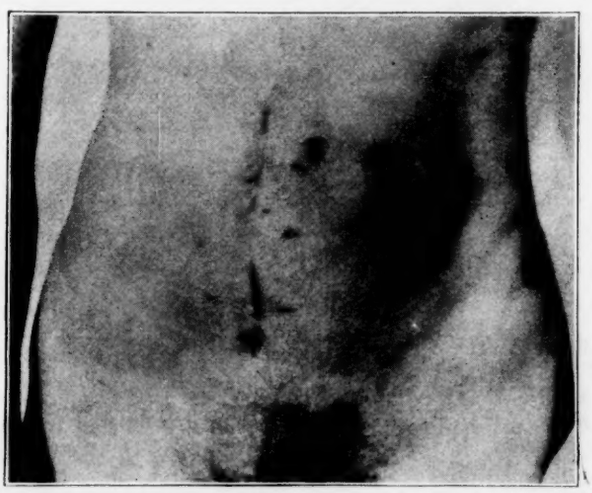

Fig. 1.—Properly placed colostomy, protruding 1 inch beyond the skin.

A tremendous amount of ingenuity has been brought to bear on the problem of the construction of colostomies in an endeavor to control the discharge of feces. All these efforts have failed. There is nothing better than a simple opening through the abdominal wall, and the control of the discharge of feces and flatus must be effected by other means than the ingeniously devised attempts at muscular or pressure control.

An abdominal colostomy should be placed high enough so that the patient can wear a colostomy belt comfortably. The opening should be made on a level with the umbilicus or at least not more than 1 inch (2.5 cm.) below that level. It is difficult to apply any form of colostomy apparatus to an opening in the left lower quadrant, especially if it is near the anterosuperior spine of the ilium, and yet a large proportion of colostomies have been placed in that location. Many authors have suggested leaving a redundant loop of the sigmoid to act as a reservoir for feces, and this procedure has been advised in recent articles in the literature.

Fig. 2.—Sistrunk type of double-barreled colostomy.

This idea is based on a misapprehension, for the reservoir does not prevent constant discharge of feces and moreover has the added danger of prolapse of the intestine outside of the abdominal wall. I prefer to place the colostomy opening in the left rectus, not more than an inch below the level of the umbilicus, and to draw the sigmoid out until no loop of redundant intestine is left within the abdominal cavity. The intestine should extend about 2 inches (5 cm.) outside of the abdominal wall so that when it has retracted in healing it will protrude about an inch. This facilitates the wearing of any colostomy dressing (fig. 1).

Stitches in the wall of the intestine should be avoided because they are prone to cause a perforation at the skin level, which is disagreeable. If a double-barreled colostomy (fig. 2) is to be made, I prefer the Sistrunk [1] type in which the two arms of the intestine are separated by an inch of the entire abdominal wall. This

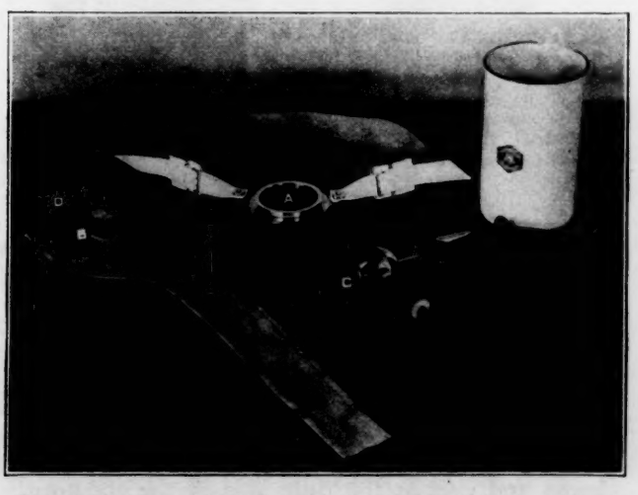

Fig. 3.—*A* shows a metal ring with flange over which the opening in the side of the rubber funnel (*B*) fits; *C*, the metal cup through which the catheter is passed, and *D*, the clip for the top of the rubber funnel.

From the Department of Surgery, University of California.
Read before the Section on Gastro-Enterology and Proctology at the Eighty-Third Annual Session of the American Medical Association, New Orleans, May 11, 1932.

1. Sistrunk, W. E.: Surg., Gynec. & Obst. **28**: 436 (May) 1919.

effectually prevents passage of feces from the upper into the lower opening. This is a real objection to the more commonly used method of simply drawing out a loop of intestine and making a lateral opening in it. In my opinion the intestine should be completely transected.

The opening between the colostomy arm and the parietal wall should always be closed by suture to prevent intestinal obstruction. Herniation of the ileum through this opening with torsion of the mesentery sometimes happens.

The comfort of the patient depends on attention to details necessary to keep him clean, and free from odor and the audible passage of flatus. This result can be accomplished by emptying the colon once a day by an efficient tap water enema and the wearing of a proper belt. It is necessary to devote about forty-five minutes to the proper emptying of the colon; during the rest of the twenty-four hours no care of the colostomy is necessary. The patient can go about his usual business without discomfort or embarrassment.

Fig. 4.—The catheter is inserted into the colostomy through the metal ring, and the metal cap is held snugly against the skin to prevent the return of water before the colon is filled.

We have devised an apparatus for the irrigation of the colon, shown in figure 3, by means of which the entire colon can be filled before any water is allowed to run out and the discharge of the contents can be completed without any danger of soiling either the person or the room, as shown in figures 4, 5 and 6. Figure 7 illustrates a simple elastic webbing belt, fastened with hooks and eyes at the right side of the abdomen. A piece of oiled silk or heavy cellophane is basted on the inside of the belt over the colostomy area and can be changed from time to time as found necessary. A few pieces of absorbent paper of the Japanese napkin type are placed over the colostomy and the belt applied snugly. If the colon has been properly emptied no feces will pass for twenty-four hours, and the belt is sufficiently snug to prevent audible passage of flatus.

I consider the foregoing method the ideal one for caring for a colostomy, but some patients prefer not to use the irrigation. For these I advise the Greer belt, illustrated in figure 8. It consists of a small canvas hat lined with a dozen thicknesses of toilet paper, or other absorbent paper, together with a metal ring through

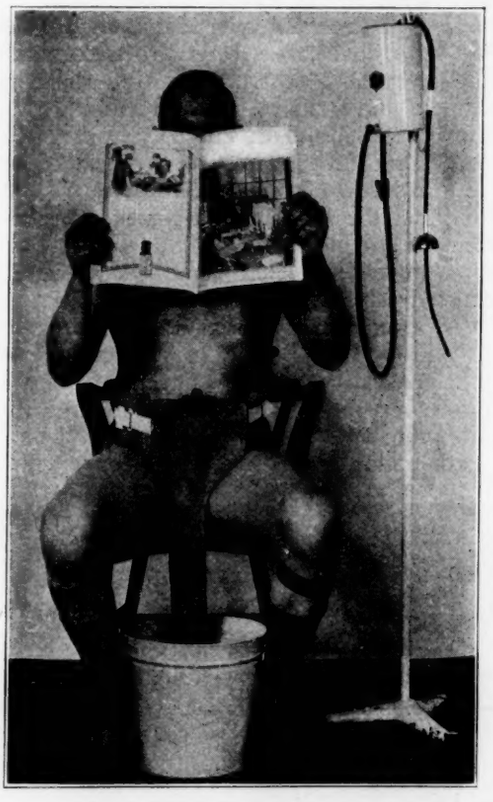

Fig. 5.—The rubber funnel is clipped together at the top and the patient can read while the colon is emptying.

which the crown of the hat passes. This belt is worn as shown in figure 9. The perineal strap is usually not necessary if the colostomy opening is high enough on the abdominal wall. The patient can change the dressing in any toilet in less than five minutes without soiling the fingers. It will be noted that no rubber is used in this apparatus. I believe all types of colostomy apparatus using rubber bags to catch the feces should be discarded, because it is impossible to keep them from having a disagreeable odor, and they are always cumbersome and uncomfortable to wear.[2]

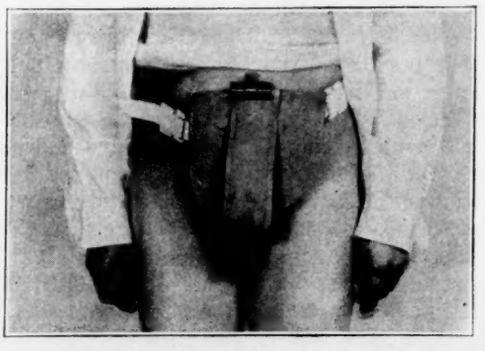

Fig. 6.—The end of the rubber tube is placed in the funnel and clipped. This forms a bag to catch the ounce or two of water that will dribble out in the next half hour.

909 Hyde Street.

2. The apparatus described in this paper is supplied by John F. Greer, 2242 Telegraph Avenue, Oakland, Calif.

ABSTRACT OF DISCUSSION

DR. FRED W. RANKIN, Rochester, Minn.: A colostomy properly made is not too unfortunate a companion to carry around. A colostomy properly made can be adequately attended to once or twice a day, provided the stools are kept formed and constipated, as Dr. Smith has shown, by irrigations once or twice a day, or without irrigations. That is merely personal taste, but the point is to get the left bowel clean and to have the patient on a constipating diet and have a formed stool, if one wishes him to be comfortable from any type of colostomy whatever. There are a few little tricks about doing colostomies that decide whether or not they are going to be borne comfortably. If one has a single-barrel colostomy made through a small stab wound midway through the anterosuperior spine and umbilicus, I believe it is in the most advantageous position for care and the application of whatever type of appliance one wishes to use, and usually the less cumbersome, the more simple the appliance, the more easily it is attended to. I feel that any type of colostomy which is difficult to make and which attempts to make a sphincter muscle on the abdominal wall is the most undesirable and useless type. The simpler one can make a colostomy, the more desirable it is, and the more trouble one goes to in making a colostomy, the more trouble the patient has taking care of it. I might emphasize that colostomy isn't such an unhappy thing to tolerate and it can be easily taken care of. There are people in all walks of life who enjoy their social life just as satisfactorily as ever, carry on their professional duties as satisfactorily as ever, with colostomies.

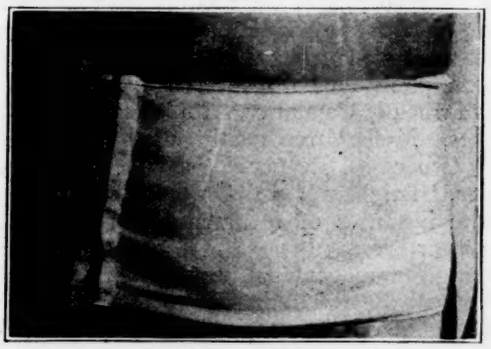

Fig. 7.—After the irrigating belt is removed this simple belt of elastic webbing is put on. Underneath the belt and over the colostomy are placed several pieces of absorbent paper. This belt is snug enough to control involuntary passage of flatus and no feces pass for twenty-four hours after irrigation.

It is more or less a duty incumbent on the medical profession to accept an optimistic idea about colostomy and not to paint this horrible picture that a man who has a colostomy is ostracized and that he might as well have had nothing at all done for his condition.

DR. LOUIS J. HIRSCHMAN, Detroit: In the use of the colostomy, whether of the temporary or the permanent variety, one must always bear in mind not only the therapeutic value of the colostomy but also the comfort of the patient both physically, temperamentally and emotionally as well. As has been said by the previous speakers, the term "colostomy" seems to be accompanied by a certain amount of dread on the part of the physician, but by a gradually lessening number of physicians. I formerly followed the lead of the original colostomy for many years and unquestioningly placed the colostomy in the lower left quadrant. In the last few years some daring individuals have ventured to raise the level of the colostomy opening, so that it has reached as high as the umbilicus. Dr. Smith is getting pretty close now, within an inch, and I predict that before long he will discover the umbilical site and use that. There are several reasons for doing so, whether one uses the delightfully simple and well fitting apparatus of Dr. Smith or any of the bags of which he does not approve, particularly if the patient is a woman, and styles of dress are as they are today. She does not wish to go around socially or to her labors with a telltale bulge on either side of the body. If it is necessary to have any bulge, it is better that it be placed centrally so it can be better disguised in dressing. If the patient has a bulge in any quadrant, the colostomy apparatus, no matter how simple, is evident, while if centrally located it is not. The umbilicus is a useful site because nature has already provided an opening into the peritoneal cavity; the muscle fibers are arched, and will adhere when one takes away fused peritoneum and fascia, so that the colon adheres and provides good anchorage and prevents herniation. I still have the

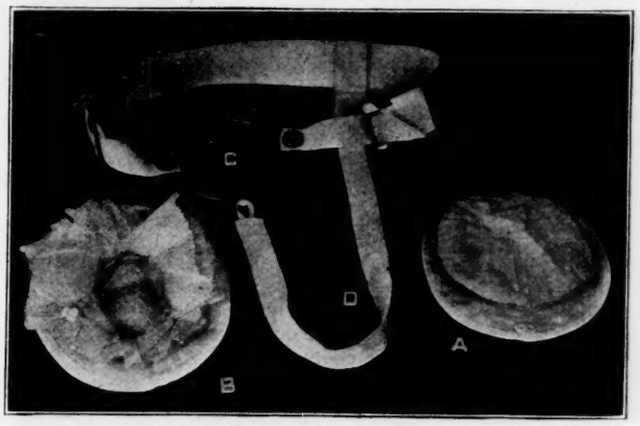

Fig. 8.—The Greer belt. The crown of the canvas hat (*A* and *B*), lined with twelve thicknesses of toilet paper and one piece of oiled paper, passes through the metal ring (*C*). *D* shows the perineal strap.

patients wear a simple pure gum bag. As far as any unpleasant odor is concerned, I have patients alternate the bags, keeping two or three and keeping them in compound solution of cresol until ready for use. The fecal odor is eliminated.

DR. ALTON OCHSNER, New Orleans: In New Orleans a high colostomy is preferred. Acting on the suggestion of Miles, I prefer it even higher than suggested by Dr. Hirschman, in the left upper quadrant, employing the splenic flexure. Miles made the suggestion that the transverse colon might be employed as a reservoir, and since his suggestion I have been doing this. I have found that in the majority of instances irrigation is not necessary. Dr. Smith's presentation is timely because it behooves us as physicians to reeducate the medical profession as well as the public concerning the lack of discomfort from colostomies. Patients can be perfectly comfortable. One reason they sometimes are not is that we probably don't take sufficient care postoperatively to see that they are made comfortable, and possibly because of the incorrect location of the colostomy. If these details are paid attention to, we can change the present idea concerning the discomfort from colostomy.

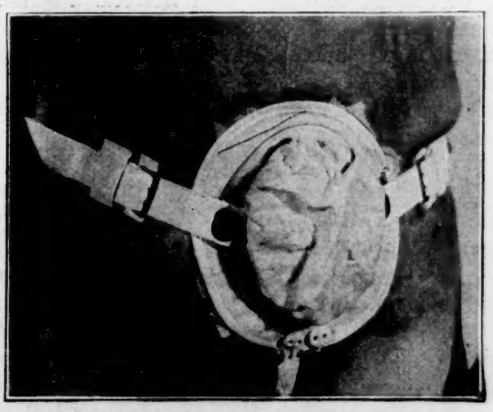

Fig. 9.—The Greer belt, as worn by the patient.

DR. C. C. MECHLING, Pittsburgh: I think the message Dr. Smith has brought forward should be delivered to the general practitioners. They are the people who first have contact with the patient and usually, in the last analysis, advise the patient as to the proper method of procedure. I have repeatedly advised permanent colostomies for extirpation of the bowel to cure a malignant disease, and find my arguments put to naught when the patient returns to the practitioner. Proctologists will have

to convert the practitioner to this idea; otherwise we shall not get far with our religion of surgical treatment in cancer of the rectum. I have been surprised, too, when one advises the formation of a colostomy and the argument has been put over in a conclusive way, to find the patient refuse it and go to the second physician and, when the same advice is given, there is a ready acquiescence to the argument. This has distressed me on a number of occasions because I thought I was not presenting a good argument. However, in recent years I have found that these patients sometimes have seen the other fellow first, and when my argument is produced, there is ready acquiescence to it. We shall continue to recommend the colostomy and the patient will refuse to accept our advice, but the next man who sees the patient will reap the reward.

DR. DUDLEY A. SMITH, San Francisco: I think Dr. Hirschman has the "bulge" on us regarding the location of the bulge, but I think we have the bulge on him in regard to the use of pure gum bags for colostomy apparatus. I was delighted to hear him say that he had to soak these bags in compound solution of cresol in order to destroy the odor, and I submit to you that the odor of compound solution of cresol is not often met with and will point a patient out much more readily than some of our more frequent odors.

DR. LOUIS J. HIRSCHMAN, Detroit: May I say that the compound solution of ceresol is washed off, of course, before the patient applies the bag.

GRANULOPENIA AND AGRANULOCYTIC ANGINA

HENRY HARKINS, M.D., PH.D.
CHICAGO

Ten years ago Schultz [1] reported six cases of fatal leukopenia and granulopenia associated with necrotic pharyngitis. In the following decade several hundred additional cases have been reported and a voluminous literature has been amassed on the subject. Many of the cases reported lately have not conformed exactly to the original specifications of Schultz. Recently attempts have been made to classify these numerous and varied cases. A modification of the classification of Roberts and Kracke [2] is as follows: (1) primary granulopenia—agranulocytic angina; (2) secondary granulopenia due to (*a*) chemical poisons, (*b*) radiation, (*c*) sepsis and (*d*) blood diseases—pernicious anemia, aleukemic leukemia and aplastic anemia, (*e*) infections—measles, mumps, influenza, typhoid and malaria. It is possible that eventually all cases will be considered secondary.

Schultz proposed the name agranulocytosis for his syndrome, and a year later Friedemann suggested the term agranulocytic angina. Lately the former name has been adopted because of its brevity, but as Schilling [3] points out, it is not etymologically accurate. To quote Schilling:

> The name "agranulocyte" was originally chosen for "neutrophiles without granulations" of leucemias. By "agranulocytosis" is meant an increase in these atypical neutrophiles, which was not intended.

Schilling suggests the term malignant neutropenia for the condition, but this does not give the full picture because not only the neutrophils but all the granulocytes are decreased. There seems to be no objection to the name granulocytopenia or the shorter granulopenia.

It will be impossible to cover all the aspects of granulopenia in a short paper. Hence the discussion will be confined to four points of interest, namely, (1) a discussion of recurrent granulopenia, (2) a presentation of seventeen cases and a brief discussion of (3) the etiology and (4) the treatment of primary granulopenia.

RECURRENT GRANULOPENIA

In 1930, Franke [4] was able to find reports of only three instances of recurrent granulopenia. In 1931, I collected five cases,[5] and now thirty-one additional reports bring the total to thirty-six. None of Schultz's original series were cyclic in nature. The boy seen by Leale [6] in 1910, whose case was reported later by Rutledge, Hansen-Prüss and Thayer,[7] presents symptoms different from any other reported case. This patient has had periodic attacks of leukopenia at three weeks' intervals for twenty years. Goldenberg [8] reports a case of granulopenia with death from a third attack. Two of Reznikoff's [9] three patients had recurrences, one dying during a third attack. In Stellhorn and Amolsch's [10] series of thirty-one cases of primary granulopenia in Detroit, seven patients had more than one attack. Blumer [11] reports the case of a physician who had four attacks in six months with death from the fourth attack. Evans [12] reports the case of another physician who died from a third attack. Houser [13] mentions a patient who recovered from her fourth attack. Two of Connor's [14] fourteen patients had recurrences. Moffit [15] reports three cases, Roberts and Kracke [16] two cases, Pepper [17] two cases and Franke, Stockinger,[18] Brigham [19] and Gordon [20] each one case. Four more instances of recurrence will be presented later in this article.

Recurring granulopenia is thus not rare. Piersol and Steinfield [21] divide granulopenia as follows: (1) primary granulopenia, (*a*) acute—Schultz—and (*b*) chronic or recurrent; (2) secondary granulopenia. Perhaps most of the persons with acute cases would have recurrences if they did not die from the first attack. Few patients observed over a long period of

From the Wilber E. Post Service of the Presbyterian Hospital and the Department of Surgery of the University of Chicago.

Read before the Section on Pathology and Physiology at the Eighty-Third Annual Session of the American Medical Association, New Orleans, May 11, 1932.

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21. Piersol, G. M., and Steinfield, Edward: Granulopenia, with Especial Reference to Its Classification and the Benign Types, J. A. M. A. **96**: 2151 (June 20) 1931.

time are still alive. Two years ago I optimistically reported eight cases of granulopenia with four recoveries;[5] today only two of these patients are alive, and one of these probably did not have agranulocytic angina.

Practically all the recurrent cases conform to the specifications of primary granulopenia. Roberts and Kracke compare these relapses to the remissions of primary anemia. One of my own patients had relapses that corresponded somewhat with her menstrual periods. The phenomenon of cyclic variation in the leukocytes has been noted in normal subjects as a daily variation. Weiskotten's[22] prophase and deuterophase reactions are a uniform finding in acute benzene poisoning in rabbits. The relation of benzene poisoning to granulopenia will be discussed later in this paper.

REPORT OF CASES[23]

In the past seven years, seventeen patients with granulopenia have been treated at the University of Chicago Hospitals. Eight of the cases seem to be primary granulopenia or agranulocytic angina and nine are probably secondary granulopenia, three being preceded by sepsis, two due to aplastic anemia, two due to influenza, one due to radiation and one due to arsphenamine. It is interesting to note that twelve cases were originally diagnosed as primary, but careful analysis reduces this number to eight. This represents about half the total number, and the proportion is about the same as reported in other large series of cases. Bock and Wiede[24] classify eight of their nineteen cases as primary granulopenia, and Jackson[25] considers that thirteen of his twenty cases are primary.

CASE 1.—Dr. G. S., a man, aged 33, died after an attack of granulopenia that followed an ethmoid infection. This was considered granulopenia secondary to sepsis.

CASE 2.—G. K., a man, aged 39, died after an attack of granulopenia following the extraction of a tooth. This was considered a case of primary granulopenia.

CASE 3.—L. H., a girl, aged 2, developed granulopenia with anemia and thrombocytopenia. She died five months later of a recurrence. This case was considered granulopenia secondary to aplastic anemia.

CASE 4.—B. B., a man, aged 64, developed granulopenia after a dental extraction. He recovered. Later it was discovered that he had been taking neoarsphenamine for syphilis for over a year. This case was considered granulopenia secondary to arsenic.

CASE 5.—L. P., a woman, aged 37, developed granulopenia two weeks after the onset of a septic temperature and died. This was considered granulopenia secondary to sepsis.

CASE 6.—M. R., a man, aged 20, with pallor of several months' duration, developed severe granulopenia, thrombocytopenia and anemia five days after the incision of a peritonsillar abscess. After five months continuous granulopenia the patient died. The case was considered granulopenia secondary to aplastic anemia.

CASE 7.—M. H., a woman, a nurse, aged 23, recovered from severe granulopenia after two weeks illness. This was considered primary granulopenia.

CASE 8.—A. K., a man, single, a medical student, aged 31, was admitted to the Presbyterian Hospital on June 21, 1930, a week after a tonsillectomy.

First Attack.—The patient had symptoms of acute sore throat and general malaise the day before admission. There was a whitish membrane in each tonsillar fossa. There was no anemia or hemorrhagic tendency. Treatment included liver extract no. 343, mass of ferrous carbonate and two intravenous injections of neoarsphenamine. The changes in the white blood cells are shown in chart 1. Eleven days after entrance the patient was discharged in good condition. Blood counts in July, August and November, 1930, were practically normal. During the winter of 1930-1931, the patient gave 1,650 cc. of blood to the patient in case 9.

Second Attack.—On June 19, 1931, exactly a year after the onset of the first attack, the patient reentered the hospital with complaints of fever, malaise, vomiting and a soreness of the gum opposite the right lower molar. Examination gave negative results except for fever, slight cyanosis and a white patch

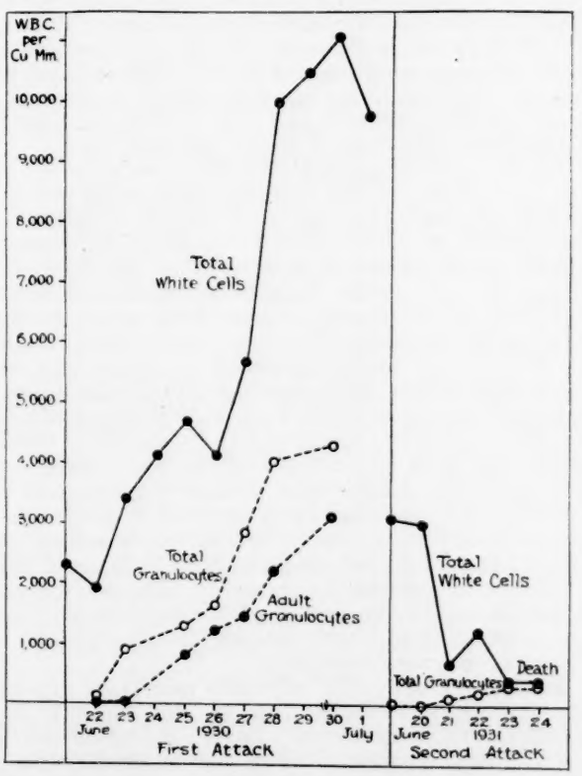

Chart 1.—Changes in the white blood cells and granulocytes in the patient A. K.

on the gum. The temperature was 100.8 F.; the pulse rate, 94; the respiratory rate, 20, and the blood pressure, 128 systolic and 76 diastolic. A blood culture was negative, and no spirilla were found. The red cells were 6,000,000; hemoglobin, 95 per cent, and platelets, 390,000. The changes in the leukocytes are shown in chart 1. The lowest white cell count was 400. Three days after admission necrotic patches developed on the gums. On June 21 there were no polymorphonuclears just before transfusion and 2 per cent seven minutes afterward. Treatment included sodium nucleinate, liver extract no. 343, three blood transfusions and neoarsphenamine given intravenously. The patient died on June 25, six days after entrance. The last three days he was irrational with fever above 107 F. Necropsy revealed extensive necrosis and suppuration of the mouth and pharynx with multiple septic infarcts in the lungs. There were no lesions in the gastro-intestinal tract below the pharynx. The local lesions, the lungs and the bone marrow contained practically no granulocytes.

Comment.—This seems to be a case of recurrent primary granulopenia. Any doubt cast on this diagnosis by the mildness of the first attack was dispelled by the extreme severity of the

22. Weiskotten, H. G.: The Action of Benzol, J. M. Research **33-39**, 1915-1919; Am. J. Path. **6**: 183 (March) 1930.

23. The first eight cases have been previously reported.[5] Two of the patients have since died, and the patient in case 4 later disclosed that he had been taking neoarsphenamine for syphilis for over a year. Brief summaries of these are included. Dr. Arthur Colwell gave me permission to use case 9; Dr. Vernon David, case 10, Dr. Knute Reuterskiold, cases 13, 15 and 16; Drs. Katsuji Kato and Arthur Vorwald, case 14, and Drs. Ernestine Kandel and Fred Adair, case 17. Case 14 is to be published in full in the American Journal of Diseases of Children by Drs. Kato and Vorwald. Dr. Reuterskiold is also reporting his cases in full.

24. Bock, H. E., and Wiede, K.: Ueber Agranulozytose, Aleukia, Amyelhämie und andere haemozytotoxikosen, Folia haemat. **42**: 7, 1930.

25. Jackson, Henry, Jr.; Parker, Frederic, Jr.; Rinehart, J. F., and Taylor, F. H. L.: Studies of Diseases of the Lymphoid and Myeloid Tissues: VI. The Treatment of Malignant Neutropenia with Pentose Nucleotides, J. A. M. A. **97**: 1436 (Nov. 14) 1931.

second. Both attacks came the week after the spring final examinations and exhaustion may have been a precipitating factor.

CASE 9.—Mrs. E. M., a housewife, aged 27, childless, had been admitted to the Presbyterian Hospital several times in the ten year period preceding her first attack of granulopenia in 1930. On all these occasions the blood count was normal. She had severe diabetes, requiring treatment with insulin, and peripheral neuritis of both legs. Several of the patient's family were extremely obese. In all attacks of granulopenia, her red cells, hemoglobin and platelets remained normal.

First Attack.—On Oct. 6, 1930, the patient developed severe gingivitis and pharyngitis. Later the gums became ulcerated and were covered by a membrane. The temperature was 100 to 104 F. for fifteen days. The white cell count fell to 700 with 4 per cent granulocytes. The patient received a transfusion of 450 cc. of blood from the patient in case 8. By October 26 she was much better and the white cells were 12,000 with 45 per cent polymorphonuclears.

Second Attack.—On Feb. 27, 1931, the patient again developed gingivitis associated with a white cell count of 600 for three days. There was another transfusion of 650 cc. of blood from the patient in case 8. Improvement began on March 10, soon after an intravenous injection of adenine. The white cell count rose to 14,000 with 60 per cent polymorphonuclears and remained at that level from March 15 to March 22. The count fell gradually until April 15, when it was 4,800.

Third Attack.—On April 15, 1931, when the white cell count was 4,800 with 16 per cent polymorphonuclears, the patient had a slight soreness of the gums. On April 22, she again received a transfusion of 550 cc. of blood from A. K. On April 24, a furuncle developed on the right shoulder. On April 27, an abscess developed in the thigh at the site of a hypodermic injection. On this date the soreness of the mouth, which was never severe during this attack, was entirely gone. On April 28, there was a sudden appearance of 30 per cent young polymorphonuclears. At the same time, the furuncle, which had now developed into an abscess 7 cm. in diameter, ceased spreading. This abscess was opened on May 9. The patient had fever from April 22 to May 5. During this attack Streptococcus hemolyticus and Streptococcus viridans were recovered from the throat and Staphylococcus albus from the abscess on the shoulder. Treatment included sodium nucleinate daily from April 17 to April 22, and adenine on April 16, 17, 20, 22 and 28. The white cells gradually decreased to 1,200 with 1 per cent polymorphonuclears on April 25. Beginning April 28, recovery was prompt, and on May 8 there were 34,000 white cells with 75 per cent polymorphonuclears.

Subsequent Course.—The white cells were 14,000 with 62 per cent polymorphonuclears on June 16. On November 6, the patient had an attack diagnosed as acute appendicitis that subsided without operation. During this attack the white cell count rose to 19,000 with 77 per cent polymorphonuclears. Three days later the count was normal. The patient is now well.

Comment.—The endocrine disturbance in the patient and her family is interesting. The case seems to be one of recurrent primary granulopenia. The use of sodium nucleinate and adenine did not seem to influence the course of the process. The use of blood obtained from a convalescent is especially interesting. The normal leukocytic response to a subsequent attack of appendicitis is to be noted.

CASE 10.—R. L., a man, single, a broker, aged 25, was admitted to the Presbyterian Hospital on Dec. 18, 1931, with chills, fever and sweats of two weeks' duration; pain in the rectum of four days' duration, and loss of weight and nervousness for one month. Eight months previously he had a sore mouth with fever and was confined to bed for several weeks. The present illness began with a chill and fever of 103 F. on December 4, but the patient was able to work. On December 14, he had another chill with fever of 104 F. Examination gave negative results except for a rectal ulcer. There was no redness or lesion in the mouth or throat on admission, but on December 25 there was a necrotic lesion on the tongue about 1 cm. in diameter. The urine was normal, the basal metabolic rate plus 10, the Wassermann and Kahn tests of the blood negative and the clotting time 55 seconds; a culture of the rectal ulcer grew B. pyocyaneus, and no acid-fast bacilli were found. The red cells were 5,000,000; the hemoglobin, 85 per cent, and there were no hemorrhagic tendencies. The lowest white cell count was 2,500 with 100 per cent lymphocytes. On December 28, there were no polymorphonuclears; two days later there were 17 per cent, and on Jan. 3, 1932, there were 61 per cent. Thereafter the blood counts were practically normal. Treatment included two operations on the rectum under ethylene anesthesia on December 19 and 31. The tissue removed indicated acute and chronic inflammatory tissue with necrosis and suppurative thrombophlebitis. Polymorphonuclears were present but rare. The patient received a blood transfusion on December 31. Other treatment included 20 cc. of leukocytic extract given intramuscularly each day from Dec. 28, 1931, to Jan. 2, 1932, and 16 cc. of sodium nucleinate by mouth beginning Dec. 24, 1931, and continued for over a month. The patient left the hospital January 9 and is now well.

Comment.—The lesions in this case of primary granulopenia were chiefly situated in the rectum. The sore mouth and prostrating fever eight months before may have been another attack.

CASE 11.—Miss J. K., a schoolteacher, aged 40, was admitted to the Billings Hospital on Feb. 22, 1931, with complaints of dry nose, dry throat, slightly sore mouth and cough of one day's duration. There was no anemia or hemorrhagic tendency. The lowest white cell count was 2,000 with 28 per cent polymorphonuclears. Two days afterward and five days after entrance, the patient was discharged clinically well with a normal blood count.

Comment.—This seems to be a case of mild granulopenia secondary to an influenza-like infection.

CASE 12.—W. E., a man, aged 31, married, a college professor, was admitted to the Billings Hospital on Feb. 8, 1931, with complaints of chills, fever, nasal discharge, sore throat and cough of five days' duration. There was no anemia or hemorrhagic tendency. The lowest white cell count was the day after admission with 2,400 white cells and 100 per cent lymphocytes. Five days later the patient was discharged clinically well with a normal blood count.

Comment.—This seems to be another case of granulopenia secondary to an influenza-like infection.

CASE 13.—T. Z., a woman, aged 45, developed granulopenia four years after a radium burn and one month after treatment with acetarsone for supposed amebic dysentery. She died a week after the onset. This was considered a case of granulopenia secondary to radiation or arsenic.

CASE 14.—D. S., a girl, aged 4 years, developed granulopenia in the course of a bilateral otitis media. This was considered granulopenia secondary to sepsis. The attending physicians considered it primary granulopenia.

CASE 15.—E. T., a woman, aged 26, developed granulopenia during the course of a pulmonary tuberculosis. After two recurrences, each about two weeks after the preceding menstrual period, she died. This was considered a case of primary granulopenia.

CASE 16.—H. C., a woman, aged 57, developed granulopenia and died six days after the onset. This was considered a case of primary granulopenia.

CASE 17.—Minnie R., a widow, aged 65, a practical nurse, with three children, was admitted to the Billings Hospital on Nov. 11, 1931, with postoperative hernia. On June 20, panhysterectomy was performed for carcinoma of the uterus, and at that time the white cell count was 4,200. In July, 1931, four roentgen treatments of the pelvis were given totaling 1,950 roentgen units. On November 12, the hernia was repaired under local anesthesia, and the wound became slightly infected; cystitis developed, and the patient had fever. On November 25, the white cell count was 3,400 with 10 per cent polymorphonuclears. On December 5, after there had been granulopenia for several days, a small ulcer developed on the gum. On December 19, an ulcer was found in the rectum. There was no anemia, and the platelet count was 310,000. The patient steadily improved, the white cell count being normal or above normal after December 18, and the mouth and rectal ulcers

disappeared. The changes in the white cells during the attack are as follows: gradual fall until December 2, when the white cells were 2,500 with no polymorphonuclears. The white cells continued to fall until December 7, when they were 800. They fluctuated between 600 and 1,200 until December 16, when they began to rise and in two days were normal. The polymorphonuclears varied between 0 and 3 per cent for fifteen days, and on December 17 they began to rise, being normal on December 19. Two 10 cc. ampules of nucleotide K96 were given intramuscularly each day from December 16 to December 21, inclusive. Fever continued, and on Jan. 15, 1932, a retroperitoneal abscess was drained and about 400 cc. of pus was obtained. There was no fever above 100 F. after January 22, and the patient died on February 2 with no sign of recurrence of the granulopenia. Necropsy was not permitted.

Comment.—This seems to be a case of primary granulopenia. There is no evidence that the granulopenia was the cause of death. The roentgen treatments were probably not strong enough to account for the granulopenia.

ETIOLOGY OF PRIMARY GRANULOPENIA

It seems probable that the necrotic lesions in the gastro-intestinal tract and elsewhere are secondary to the granulopenia. Roberts and Kracke and others have shown that the white cell count is low before the necrotic lesions develop. In several cases of the present series the ulcers appeared after the fall in the white cell count and in places where there was an invading flora plus trauma, as opposite a rough tooth.

Overwhelming sepsis does not seem to be a causative factor in primary granulopenia. After granulopenia develops, numerous organisms invade the body, as is shown by the variety of bacteria isolated from the blood and organs of patients. Lovett [26] isolated B. pyocyaneus from her patient's throat and produced mild granulopenia by injecting the organism into guinea-pigs. Kato and Vorwald [27] injected B. pyocyaneus (stock culture) and Streptococcus hemolyticus (from the patient in case 14) into rabbits, and in no instance did leukopenia or granulopenia develop. While a preliminary sepsis is not a factor in primary granulopenia, granulopenia can be secondary to sepsis, as in Türk's [28] case and in three cases of the present series.

The theory that some individual idiosyncrasy or endogenic factor in the patient is at fault in primary granulopenia has much in its favor. Many patients present a history of previous leukopenia.[5] Pepper believes that the granulopenic reaction may be on an allergic basis. In none of the patients in the present series nor in any of the cases reported in the literature except Leale's patient was there eosinophilia. All my patients had hypo-eosinophilia both during and between attacks. This would speak against an allergic tendency, but would not entirely rule out an acute anaphylactic shock. Endocrine disturbance, congenital weakness of the bone marrow and the Schwartzman reaction are to be considered. Primary granulopenia is more common in females, adults,[27] in persons in the higher strata of society and possibly in persons with gallbladder disease. Precipitating factors include tonsillectomy, dental extractions, and other trauma to the mucous membrane.

An exogenic factor may also be responsible. It is possible that this factor may produce granulopenia only in susceptible persons. Only a small proportion of workers exposed to benzene ever develop benzene poisoning and only a small number of those receiving arsphenamine ever develop arsphenamine granulopenia. The unknown factor may be some unknown bacterium acting on normal persons, or one of the ordinary leukopenia-producing organisms acting on persons with an inherent defect. An example of the first might be Salmonella suipestifer, which Fried and Dameshek [29] have recently used to produce experimental granulopenia in rabbits. An example of the second might be B. influenzae, which has been isolated in several cases, including case 15 of the present series. Agranulocytic angina has been reported chiefly beginning four years after the influenza epidemic of 1918. It is said that this is because routine blood counts were not done so much before this time, but they were done frequently enough for Arneth [30] to collect twenty-five cases of severe granulopenia reported between 1888 and 1917. About half of these are associated with angina, but none seem to be primary granulopenia, eleven of them resembling aplastic anemia and fourteen being definitely secondary to sepsis. Brown's case reported in 1902 [31] and several cases reported before the time of blood smears [32] seem to resemble primary granulopenia.

Kracke [33] believes that some toxic agent associated with the benzene ring may be the cause of primary granulopenia. His experiments with coal tar products and most benzene derivatives did not produce granulopenia, but benzene itself did. Radium, thorium X, roentgen rays, arsphenamine and trinitrotoluene may produce severe granulopenia. Acute benzene poisoning closely resembles primary granulopenia, but chronic poisoning, such as Kracke would have to assume for his patients who present a history of use of coal tar products, has additional features like those of an aplastic anemia in human beings. However, Kracke has produced experimental benzene granulopenia in rabbits not associated with anemia. A moderately thorough search has not revealed any report of primary granulopenia in a worker exposed to benzene.

The question arises as to whether the action of any toxic agent present is on the leukocytes in the blood stream or on the bone marrow itself. All the cases in the present series and most of those reported in the literature show granulocytic aplasia of the bone marrow, but Fitz-Hugh and Krumbhaar [34] report a case with myeloid cell hyperplasia in the bone marrow. In severe cases the white cell count never falls to its minimum in less than three days. If Weiskotten's recent calculations as to the length of life in the blood stream of a polymorphonuclear neutrophilic leukocyte are correct, all the circulating polymorphonuclears would not disappear for four days. Brown studied the urinary output of uric acid and purine bases in his case and, finding them increased, considered that there was a destruction of polymorphonuclears in the peripheral blood stream. Other work since then gives an opposite result. However, it seems that the chief factor in producing granulopenia may be the aplasia of the bone marrow rather than a peripheral destruction of cells.

26. Lovett, Beatrice R.: Agranulocytic Angina, J. A. M. A. **83:** 1498 (Nov. 8) 1924.
27. Kato, Katsuji, and Vorwald, A. J.: Agranulocytic Angina in a Child, Am. J. Dis. Child. **44:** 556 (Sept.) 1932.
28. Türk, W.: Septische Erkrankungen bei Verkümmerung des Granulozytensystems, Wien. klin. Wchnschr. **20:** 157 (Feb. 7) 1907.
29. Fried, B. M., and Dameshek, William: Experimental Agranulocytosis: Infection of Rabbits with Salmonella Suipestifer by Way of the Blood Stream, Arch. Int. Med. **49:** 94 (Jan.) 1932.
30. Arneth, Joseph: Die speziellen Blutkrankheiten im Lichte der qualitativen Bluthehre, Münster, Heinrich Stenderhoff, 1930, vol. 2, pp. 1-91.
31. Brown, P. K.: A Fatal Case of Acute Primary Infectious Pharyngitis with Extreme Leukopenia, Am. Med. **3:** 649 (April 19) 1902.
32. Pepper, O. H. P.: The History of Agranulocytic Angina, J. A. M. A. **97:** 1100 (Oct. 10) 1931.
33. Kracke, R. R.: The Experimental Production of Agranulocytosis, Am. J. Clin. Path. **2:** 11 (Jan.) 1932.
34. Fitz-Hugh, T., Jr., and Krumbhaar, E. B.: Myeloid Cell Hyperplasia of Bone Marrow in Agranulocytic Angina, Am. J. M. Sc. **183:** 104 (Jan.) 1932.

TREATMENT OF PRIMARY GRANULOPENIA

It is obvious that after a patient has had granulopenia so long that his body is invaded by every organism lurking in the mouth, rectum or other normally infectious region, any attempt to raise the white cell count and bring the resistance back to normal will not save the patient's life. Good oral antisepsis, gargles and other efforts to treat the local angina may delay the entrance of organisms from the mouth and pharynx, but if the white count is not raised soon enough, eventually the organisms will multiply and enter the system from even the cleanest mouth. Intravenous neoarsphenamine is intended to prevent the proliferation of only one type of oral flora. Although I have used it, the possibility of bone marrow damage condemns it. All treatment should be directed primarily toward raising the granulocyte count as soon as possible. In addition to attempts to stimulate leukocytosis with sterile abscesses, etc., treatments may be classified under three main heads, as follows:

1. *Blood Transfusion.*—In the series of cases reported in this paper, blood transfusion seemed to be of little value. Assuming that one-twelfth of the body weight is blood, transfusion of a pint of blood will theoretically raise the percentage of polymorphonuclears only 6 per cent. In case 8 the polymorphonuclear percentage was raised from 0 per cent just before transfusion of a pint of blood to 2 per cent seven minutes after. Pepper [17] found no granulocytes after transfusion. Theoretically, hemorrhage might be more productive of bone marrow stimulation and Pepper quotes two cases of recovery after hemorrhage. Exsanguination transfusion might be tried. No technically satisfactory method of transfusing leukocytes alone is available at present.

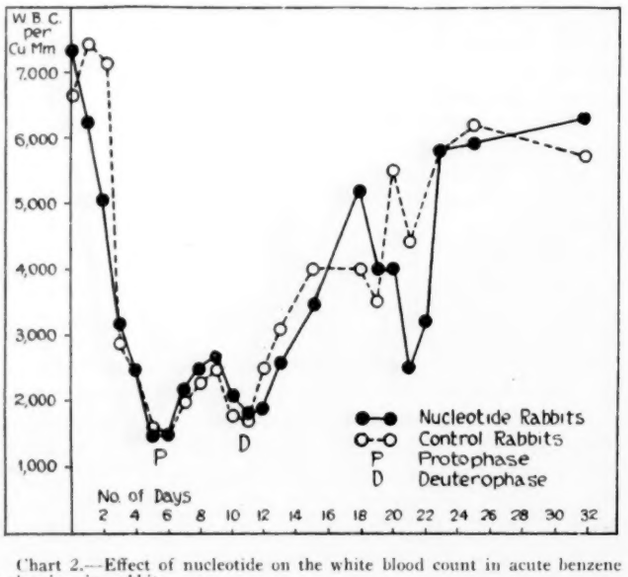

Chart 2.—Effect of nucleotide on the white blood count in acute benzene poisoning in rabbits.

2. *Roentgen Therapy of the Long Bones.*—Friedemann and Elkeles [35] treated forty-three patients with roentgen rays, but their results are not conclusive. Taussig and Schnoebelen [36] report two cases of recovery in which two roentgen treatments each had been given and two fatal cases in which there were four treatments each. Their small series is as much an argument against overdosage as it is in favor of any dosage. All of the three patients in the present series who received roentgen treatments died; one of these was moribund before treatment was begun.

3. *Administration of Various Extracts and Drugs to Stimulate the Bone Marrow.*—Liver extract, iron, leukocytic extract, sodium nucleinate, adenine and guanine have all been tried with indifferent results. The results in the present series are shown in the table. Gray [15] believes that leukocytic extract may be of some value. Evans [12] reports one case in which recovery followed

Results of Various Methods of Treatment in Eight Cases of Primary Granulopenia

Treatment By	Cases 2	7	8	9	10	15	16	17	Cases Treated	Cases Recovered	Per Cent Recovery
Transfusion.....	0	+	+	+	+	+	0	+	6	4	66
Neoarsphenamine..	+	0	+	0	0	0	0	0	2	0	0
Roentgen rays.....	0	0	0	0	0	+	+	0	2	0	0
Liver extract.....	0	+	+	0	0	0	0	0	2	1	50
Sodium nucleinate.	0	0	+	+	+	0	0	0	3	2	66
Surgical intervention.....	+	+	0	0	+	0	0	0	3	2	66
Adenine.....	0	0	0	+	0	0	0	0	1	1	100
Nucleotide K 96....	0	0	0	0	0	0	0	+	1	1	100
Leukocytic extract	0	0	0	0	+	0	0	0	1	1	100
Recovery from granulopenia....	0	+	0	+	+	0	0	+			

the use of quinine. Nucleotide and allied substances have been especially advanced by Reznikoff [9] and Jackson.[25] The latter author reports seven recoveries in a series of thirteen cases of primary granulopenia in which nucleotide K 96 was used. The patient in case 17 of the present series began to recover from her granulopenia the day injections of nucleotide K 96 were begun. It was difficult to determine whether this was a coincidence. Jackson reports two recoveries in cases of chronic benzene poisoning following the use of nucleotide K 96.

I attempted to produce in rabbits a granulopenia that would be sufficiently constant to be reduplicated in a large series of animals. This would serve as a means of testing various agents used in the treatment of granulopenia. Kracke's [33] method of producing chronic benzene poisoning gives too variable results for this purpose, and Fried and Dameshek's [29] rabbits with severe granulopenia usually died in a few hours. Weiskotten [22] and others have shown that, after acute benzene poisoning, the leukocytes decrease and return to normal with a biphasic reaction, the entire process being completed in about twenty-one days. The first drop or protophase occurs about the sixth day and the second drop about the twelfth day. Using this reduplicable reaction, the following experiment was conducted to test nucleotide therapy of acute benzene poisoning:

EXPERIMENT

Male rabbits weighing from 1.5 to 2.2 Kg., of Dutch and Dutch breed, pedigreed for three generations, were used. One each of twin brothers was used as control and as test rabbit in most cases. Blood counts were made from the ear vessels.[37] The benzene was injected subcutaneously in the anterior abdominal wall and the nucleotide intramuscularly in the right thigh. All rabbits were given benzene, the dosage being 1.33 cc. per kilogram of a solution of equal parts of chemically pure benzene and olive oil (thus really 0.66 cc. of benzene per kilogram). The rabbits received this dose the first and second days and only half a dose the third day. Half the rabbits were given the benzene only and were used as controls, and the other half received 1 cc. of nucleotide K 96 per kilogram each day from the first to the ninth inclusive. The changes in the white cell count are given in chart 2. The protophase and the

35. Friedemann, U., and Elkeles, A.: Die Roentgenbehandlung der Agranulozytose, Deutsche med. Wchnschr. **56**: 947 (June 6) 1930.
36. Taussig, A. E., and Schnoebelen, P. C.: Roentgen Treatment of Agranulocytosis, J. A. M. A. **97**: 1757 (Dec. 12) 1931.
37. All counts were made by Mr. Francis Phillips or by me.

deuterophase in the two series practically coincides. This seems to indicate that nucleotide has little effect on the granulopenia of acute benzene poisoning.

These results cannot be applied to agranulocytic angina because in it the granulopenia may not be of the same nature as in benzene poisoning. The clinical reports seem more favorable for the use of nucleotide in agranulocytic angina than for any other type of therapy.

SUMMARY AND CONCLUSIONS

1. Reports of thirty-six cases of recurrent granulopenia are collected from the literature.

2. Seventeen cases of granulopenia have been observed in the University of Chicago Hospitals. Eight of these seem to be primary granulopenia and in four more than one attack occurred.

3. The etiology of primary granulopenia is as follows:

(*a*) The oral lesions and sepsis are secondary to the granulopenia.

(*b*) Primary granulopenia may be due to some endogenic factor such as allergy, endocrine disturbance or congenital deficiency of the bone marrow.

(*c*) On the other hand, the causative factor may be an exogenic agent, acting either on a normal person or on a person with a special susceptibility. Unknown organisms, B. influenzae, and chemical poisons are to be considered.

(*d*) The causative agent acts chiefly on the bone marrow.

4. The following conclusions are made concerning the treatment of primary granulopenia:

(*a*) Oral antisepsis merely delays the entrance of malignant organisms into the system. Conversely, attempts to restore the white cell count to normal will not save the patient's life if sepsis is too advanced.

(*b*) Blood transfusion and roentgen rays are of no proved value.

(*c*) Chemical agents intended to stimulate the bone marrow are in general ineffective. Some evidence has collected to indicate that nucleotide is of value in primary granulopenia. Nucleotide did not affect the course of the granulopenia in acute benzene poisoning in rabbits.

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ABSTRACT OF DISCUSSION

DR. CLYDE BROOKS, New Orleans: Dr. Eugene Payne and I have had five cases of what we are calling agranulemia, which is another word for agranulocytosis or granulopenia. We are suggesting this word in order to simplify the terminology. Agranulemia is the condition in which there is extreme reduction of granulocytes; granulopenia the one in which there is moderate reduction of granulocytes. With regard to the cause of agranulemia, some cases seem to occur with chemical poisoning: Kracke used benzene to produce agranulemia, and one of our patients had been a hard drinker and was drunk a long time before he came down with the angina. I recently saw a case in a young physician who had been drinking a good deal of alcoholic liquor for some time before he came down with a severe sore throat and a very low granulocyte count. He recovered and quit drinking and has not had a relapse. One patient entered the hospital moribund and died a few hours later. In the other four cases we administered nonspecific protein intravenously, and the blood counts returned to normal in about forty-eight hours. Since treatment, there has been no relapse in any of these cases so far as we know. We are inclined to try further the use of nonspecific protein in agranulemia.

DR. MERTON M. MINTER, San Antonio, Texas: During the past two years I have studied a girl who had had a known granulopenia for three years. During this period her highest known leukocyte count was 1,700 and her highest polymorphonuclear leukocyte percentage 32. She had been treated by a number of physicians with nearly everything which had been recommended, including neoarsphenamine, blood transfusions, roentgen irradiation, and nonspecific protein injections. When I saw her two years ago she had 400 leukocytes with 16 per cent polymorphonuclears, an incurable Vincent's angina, and a rather severe bronchitis. She was treated for two months, during which time roentgen exposures were made over an enlarged spleen. There was no appreciable change in her general condition or leukocyte count. In all the suggested therapeutic aids which have shown promise, nucleic acid, or its derivatives, has been present. The latest report of Jackson, who has obtained the best apparent curative effects with K 96, was not published when treatment was started on this patient in 1930. I gave her raw, ground, two month fetal calf spleen in tomato juice and she made a rapid recovery after having had the disease for three years. Her count rose steadily to 4,100, with 52 per cent polymorphonuclears. The spleen was omitted for ten days with a symptomatic and laboratory relapse, but recovery was prompt when treatment was resumed. It was omitted again three months later with another drop in the count, but at no time did the count approximate what it was before spleen treatment was begun. Resumption again produced a satisfactory rise to 5,100 leukocytes with 75 per cent polymorphonuclears. Last July she omitted all treatment except general hygienic care, and a recent report from Dr. George Dock, who is now taking care of her, indicates that she is well.

DR. OLIVER W. HILL, Knoxville, Tenn.: I have had three cases of this condition come under observation in three months. They were from different sections, in areas of about 75 miles. Incidentally, my mortality was 100 per cent. Two of the patients were girls and one was a boy. They were referred cases, and all had a history of having had some throat difficulty. One of them had the ulcerative type of throat. But the physician who sent the last boy in said the throat was only red and inflamed; all of the patients, however, had the typical blood picture. Two of them died of hemorrhage after being sent back. But it occurred to me that there seems to have been an increase in the different blood dysphagias such as this, in children, in the last few years. I have been doing blood counts or having them done the same as usual. But with the increasing number of these infections they couldn't have been missed because the routine has been about the same for the last eight or ten years. The incidence of this condition is increasing.

DR. HENRY N. HARKINS, Chicago: A great deal of comment has been aroused concerning the name which should be applied to this disease. For example, the same granulopenia, which I have used and which was first introduced by Kracke, is not a complete name because the lymphocytes and monocytes are also absolutely decreased. The name agranulocytosis, originally given to the condition by Schultz, has been criticized by Schilling, who says that originally the term "agranulocyte" was intended to refer to leukocytes without granules in leukemia, and that "agranulocytosis would imply an increase in these atypical leukocytes, which is not intended. The word agranulemia would relieve only part of this objection. Some observers, noticing that their patients received certain drugs before the onset of the condition, tend to consider that these might be the causative agents in all cases. I think caution should be used in this connection because it is known that more than one agent will produce a secondary granulopenia. Benzene will produce a definite granulopenia. Farley has reported thirty-nine cases of severe granulopenia following the administration of arsphenamine and neoarsphenamine. Many persons with granulopenia have a history of overdosage of x-rays and radium. One of my patients won a suit a year before the onset of the condition because of accidental radium overdosage. Thus, caution should be used in the consideration of an agent that may seem to be a causative factor in any single case as the cause of all cases of granulopenia. Splenic therapy seemed to be highly effective in the chronic case mentioned in the discussion, but in acute cases the time element must be considered. The medical student whom I saw had a fever of 107 F. four days after the onset

of the condition and died three days later with bronchopneumonia, septic infarcts in the lungs and a huge swelling of the neck and axilla. Bacteria were recovered from the bone marrow, spleen and liver. Thus, for splenic therapy to prove efficacious it should cause improvement in the blood count before these septic changes occur. A therapeutic agent that acts over a long period may be helpful in a chronic case but will not necessarily produce cure in all the acute cases.

VAGINAL ENTEROCELE

REPORT OF THREE CASES

W. H. BUEERMANN, M.D., Ph.D.
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Whenever a relatively rare clinical entity is of such a nature as to be readily confused with one of common occurrence, an enlightened clinical and surgical judgment results from an analysis of their differential symptoms and signs. Vaginal hernia or enterocele presents such an entity.

LITERATURE

The number of cases of vaginal hernia reported in the literature is relatively small. In 1736, Garengeot [1] described a case, which was later followed by a description of similar cases by Verdier, Hain, Sandifort and Richter. In 1804, Sir Astley Cooper [2] reported a postmortem case in his classic work on hernia. Barker [3] stated that no case was recorded in the first sixteen volumes of the *Transactions of the Obstetrical Society of London*. Most of the earlier works on gynecology give no mention to the subject or else describe it briefly as a pudendal hernia. Taylor,[4] in 1831, and Bernard, in 1846, each reported a case, and Barker,[3] in 1876, reviewed four cases in which no operation was done. Gunz, in 1879, reported two cases, in one of which the hernial sac was mistaken for a uterine polypus and a piece of the transverse colon and omentum excised with the sac. The second case was mistaken for a vaginal cyst, and a trocar aspiration resulted in death from peritonitis. Thomas, [5] in 1885, described a case and presented an excellent review of the literature which helped to clarify the diagnosis and symptomatology of vaginal hernia.

A thorough review of the literature dealing with this subject was rewarded by finding fifty-seven case records with fairly complete data. An additional fourteen cases were found with incomplete data and three cases were added by the author, making a total of seventy-six cases. There were ten additional cases recorded in the literature which were found in either unavailable foreign journals or in obscure medical publications, making a total of about eighty-six cases recorded in the literature.

CLASSIFICATION

A vaginal hernia is formed whenever a portion of the abdominal contents pushes a peritoneal sac through an opening in the pelvic floor which presents itself as a bulging into the vagina.

Five distinct types of hernia into the vagina or vulva may be possible.

1. Cystocele, or hernia of the bladder into the anterior vaginal wall.

2. Rectocele, or hernia of the anterior wall of the rectum, presenting as a bulging into the posterior wall of the vagina.

3. Vaginal enterocele or hernia: (*a*) A peritoneal sac with bowel or omentum presenting either anteriorly, between the bladder and uterus, or posteriorly, between the uterus and rectum, and pushing the posterior vaginal wall forward. (*b*) Complete uterine prolapse with enterocele.

4. Pudendal enterocele or hernia, a descent of the small intestine into a peritoneal sac extending into the labium majus of one or both sides.

5. Perineal enterocele or hernia, a descent of the small intestine into a peritoneal sac extending through the levator ani muscles and bulging through the ischiorectal cavity.

6. Hedrocele (Zuckerkandl [6]), a protrusion of the culdesac into the anterior wall of the rectum.

The relative frequency of cystocele and rectocele is well known. Moschcowitz [7] added one case of perineal hernia to twenty-four previously reported, and Chase [8] reviewed the literature on pudendal hernia, adding one to the twelve previously reported. It is thus seen that the acquired types of vaginal hernias which present a peritoneal sac, including peritoneal contents, form a relatively rare group.

REPORT OF CASES

Case 1.—A woman, 61 years of age, who had been pregnant three times, complained of a mass bulging from the posterior vaginal wall for fifteen years. The mass had gradually increased in size, and for the six months' period prior to examination in July, 1930, the patient had noticed a gurgling sound when walking. The mass protruded about 3 inches when she was standing, and it interfered with walking.

In 1912, a subtotal hysterectomy and left oophorectomy had been performed. In 1913, she had a rectocele repaired and an excision of the cervix performed. The rectocele recurred almost immediately following the operation. In 1914, another attempt was made to repair the rectocele. This again recurred several months after the operation. She was told at this time that the tissues were too weak to supply support, and further surgical treatment was discouraged.

The patient was a well developed woman weighing about 145 pounds (66 Kg.). Examination revealed a protruding mass, the size of a small orange, arising from the posterior vaginal wall (fig. 1). The mass could be easily reduced into the vagina, but promptly recurred with coughing or straining. Gurgling was noted, and after digitally compressing the mass and releasing the pressure, peristaltic waves were noted coursing over the mass. It protruded on standing and was reduced spontaneously when the hips were slightly elevated. Digital rectal examination showed no rectocele, and the examining finger did not enter the protruding mass. There was slight perineal relaxation present, but no cystocele.

A diagnosis of vaginal hernia was made.

On August 5, an abdominoperineal repair of the hernia was made. Through a low midline incision the loops of small bowel were removed from the hernial sac in Douglas' pouch (fig. 2), and the edges of the sac approximated. The lateral walls of the culdesac were obliterated after the technic of Moschcowitz, the two stumps of the round ligaments were

Read before the Section on Obstetrics, Gynecology and Abdominal Surgery at the Eighty-Third Annual Session of the American Medical Association, New Orleans, May 13, 1932.

1. Garengeot: Mem. Roy. Acad. Sur. (16th century) quoted by Young: Edinburgh M. J. **27**: 882, 1881-1882.
2. Cooper, Astley: Abdominal Hernia, 1804.
3. Barker, Fordyce: Vaginal Hernia or Enterocele, Am. J. Obst. **9**: 177-192, 1876.
4. Taylor, John: Case of Vaginal Hernia, Lancet **17**: 205-207, 1831.
5. Thomas, T. G.: Vulvar and Vaginal Enterocele, New York M. J. **42**: 705-711, 1885.
6. Zuckerkandl, Otto: Beiträge zur Lehre von den Brüchen im Bereiche des Douglasschen Raumes, Deutsche Ztschr. f. Chir. **31**: 590-608, 1891.
7. Moschcowitz, A. V.: Perineal Hernia, Surg., Gynec. & Obst. **26**: 514, 1918.
8. Chase, H. C.: Levator Hernia (Pudendal Hernia), Surg., Gynec. & Obst. **35**: 717, 1922.

identified and incorporated into the line of suture and the abdomen was closed (fig. 3).

In the lithotomy position, through an incision in the posterior vaginal wall, the empty hernial sac was dissected free from its attachments to the point where sutures were placed from above. The sac was ligated with a transfixion suture and excised.

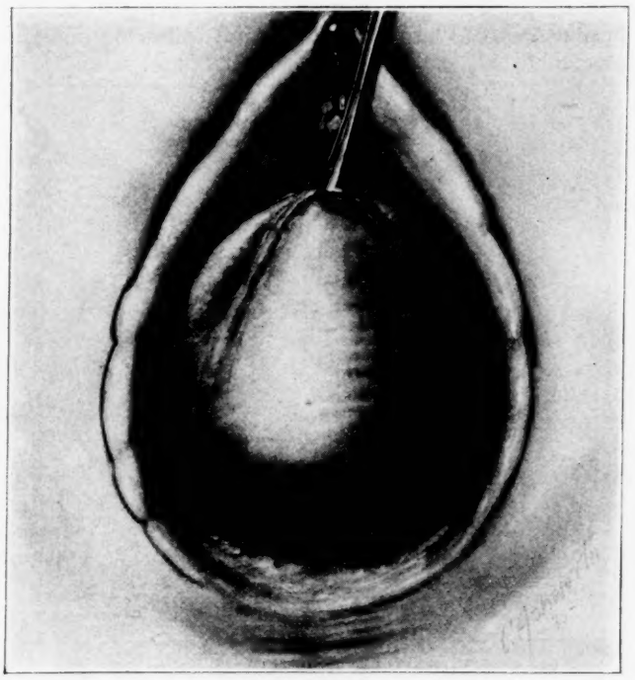

Fig. 1.—Mass presenting at vaginal orifice with patient straining.

The cleavage plane along which the hernia descended was obliterated, and a plastic closure of the posterior rectal wall was done (figs. 4 and 5).

There has been complete relief from symptoms, with no evidence of recurrence of weakness to date.

CASE 2.—Mrs. M. O., a widow, 67 years of age, gave as her chief complaint a feeling of pressure in the rectum and vagina. She had had a bilateral oophorectomy in 1900, and was a nullipara. During 1928 she noticed a bulging mass developing along the posterior vaginal wall. A posterior colporrhaphy and perineorrhaphy were done at this time with relief of symptoms for only about six months. At the time of recurrence the patient complained of a bearing down sensation in the vagina and rectum, associated with a rather marked costiveness. There was no history of backache, and the patient was otherwise in normal health.

Physical examination revealed a vaginal introitus which barely admitted an index finger. Digital examination revealed a relaxation of both anterior and posterior vaginal walls, without evidence of uterine prolapse. A decided redundancy of the posterior vaginal wall was noted. Because of the cystocele and the relaxed posterior vaginal wall, operation was advised.

At operation, March 5, 1931, the previously repaired perineum was incised in the midline to give ample room. During the straining under anesthesia it was noted that the posterior vaginal wall ballooned out each time the patient strained. An assistant's finger inserted into the rectum failed to enter the presenting mass, and a diagnosis of posterior vaginal hernia was made. The cystocele was repaired; the posterior vaginal wall was then opened and the peritoneal sac dissected free, isolated as high as possible and inverted. The rectovaginal septum was obliterated by interrupted sutures, and a plastic repair done on the posterior vaginal wall, removing redundant tissue. The patient had requested that no abdominal incision be made; hence pelvic fixation of the sac with obliteration of the culdesac was not done.

In August, 1931, she still complained of a sense of fulness in the rectum. Vaginal discomfort had entirely disappeared. Examination showed no evidence of cystocele and a firm union, without relaxation of the posterior wall, even on coughing. Digital examination of the rectum in the lithotomy position revealed a redundancy of the anterior rectal wall impinging on the examining finger when the patient coughed. This gave one the impression of a bulging mass with a definite cough impulse. With the patient in the knee-chest position, the bulging mass entirely disappeared. Coughing, in this position, again gave the cough impulse. A diagnosis of hedrocele, or rectal hernia, was made (fig. 6).

CASE 3.—Mrs. J. S., a widow, 66 years of age, presented herself for examination because of a vaginal mass of six months' duration. She had entered the climacteric at 50 years of age, and had had six children, of whom five were living. There had been no serious illnesses in the past and no previous operations.

The patient stated that for the past six months she had noticed a mass protruding from the vagina. This mass was more noticeable on coughing or straining and entirely disappeared on lying down. She had experienced a bearing down sensation with each act of micturition and had noted that frequency was more marked during the day. There was no nocturia, and she gave no history of backache.

The appetite had been good and the bowels regular. This patient had suspected a thyroid enlargement, but had had no pressure symptoms referable to the thyroid. There had, however, been definite symptoms of nervousness, tachycardia, palpitation, intolerance of heat and weakness of the quadriceps.

Physical examination revealed as positive findings, an adenoma of the thyroid, 3 by 3 cm. in diameter, associated with a blood pressure of 165 systolic and 90 diastolic and a pulse rate of 88. Vaginal examination revealed a relaxed perineum; the uterus was atrophic and the cervix small and lacerated, but with no evidence of uterine prolapse. The anterior vaginal wall presented a bulging mass, about the size of a goose egg, which presented on coughing or straining and spontaneously decreased in size on elevation of the hips. Digital reduction of the mass was easily accomplished. A sound passed into the bladder did not enter the bulging mass. No cystocele was present and only a grade 1 rectocele was present.

This patient refused operation and further investigative work regarding her thyroid when informed that the mass was not a cancer, which she had feared it might be.

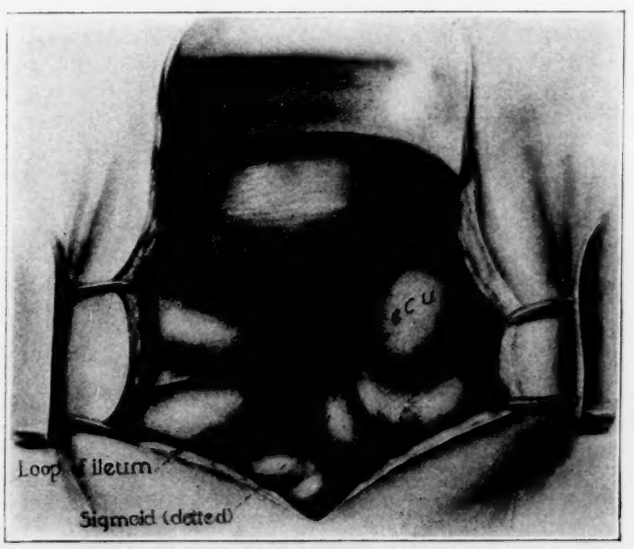

Fig. 2.—Operative view of loop of ileum extending into the vaginal hernial sac.

CLINICAL DATA

Evaluation of data found in seventy-six cases of vaginal enterocele found in the literature presents the following interesting information.

Location of Hernia.—Posterior vaginal hernia was found in fifty-six, or 73.8 per cent, of the cases studied,

with anterior hernia present in fifteen, or 19.7 per cent, of the cases. No indication as to location was found in five, or 6.5 per cent, of the cases.

Age Incidence.— In only forty-eight of the seventy-six cases was the age of the patient mentioned. In this group, the oldest patient was 67 years of age and the youngest 17 years of age, and the average age incidence of vaginal enterocele was 41.5 years. When analyzed by decades the following distribution was found.

10-19 years	1 case
20-29 years	8 cases
30-39 years	13 cases
40-49 years	12 cases
50-59 years	6 cases
60-69 years	8 cases

Diagnosis at Time of Operation.—A diagnosis of vaginal hernia only was made in twenty-nine cases, or 49 per cent of the fifty-nine cases in which this information was complete. Vaginal hernia and some degree of prolapse were diagnosed in twenty-one, or 35.5 per cent, whereas a diagnosis other than vaginal hernia was made in twenty-three cases, or 38.9 per cent of the fifty-nine cases.

In reviewing this series of fifty-nine cases again on the basis of correct diagnosis at the first examination, or operation, it was found that in thirty-five, or 59.4 per cent, of the cases a correct diagnosis of vaginal hernia was made. In twenty-four, or 40.6 per cent, of the cases the true nature of the condition was not recognized either at the examination or at the time of operation.

Uterus in Situ.—The uterus had been removed in four of the fifty-nine cases prior to the onset of the symptoms of vaginal hernia.

Type of Operation Done.—In twenty-seven of the fifty-nine cases, or in 45.9 per cent, no operation was performed.

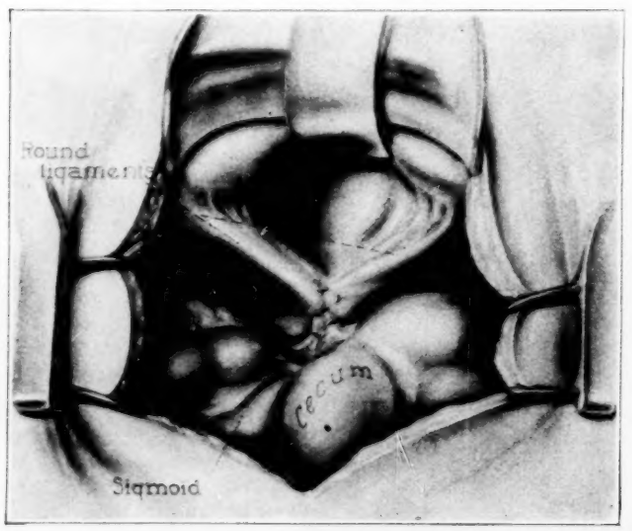

Fig. 3.—Procedure employed to obliterate the culdesac.

Some type of perineal repair was used in fourteen of the patients with vaginal hernia, and in an additional fourteen patients the combined abdominal and perineal operation was used. The abdominal route only was used in five cases.

A spontaneous cure of the vaginal hernia following pregnancy or pelvic infections was encountered in seven of the fifty-nine cases, or in 11.8 per cent. It is of interest from the standpoint of mistaken surgical diagnosis to note that in ten, or 30.3 per cent of the thirty-three patients surgically treated, a recurrence was noted either immediately or within several months following the operation.

Parity of Patients with Vaginal Hernia.—The question of pregnancy as a predisposing factor in vaginal hernia seems to be borne out by the following observations. A history of multiple pregnancies preceding the onset of vaginal hernia was encountered in thirty-three of the fifty-nine cases, or in 55.9 per cent. Five additional patients gave a history of only one pregnancy preceding the onset of the hernia, whereas four patients were nulliparas and in seventeen instances no record was given of the parity of the patient.

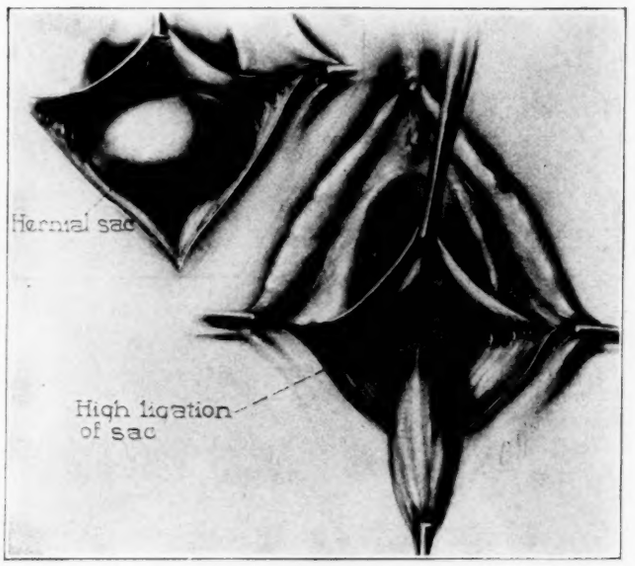

Fig. 4.—Method of treating the hernial sac after evacuation of its contents.

Mode of Onset.—In thirty-five of the fifty-nine cases the mode of onset of the hernia was given as gradual. A sudden onset was claimed in an additional eleven cases, and in thirteen instances no record was given of the mode of onset.

Complications Found with Vaginal Hernia.—That the presence of a vaginal hernia is not without the possibility of serious complications is shown by the following list of complications.

(*a*) Interference with normal delivery, 10 cases.
(*b*) Hernia incised or excised due to error in diagnosis, with death, 3 cases.
(*c*) Pelvic abscess following delivery with spontaneous recovery, 2 cases.
(*d*) Rupture of hernia with evisceration and death, 2 cases.
(*e*) Rupture of hernia with recovery, 1 case.
(*f*) Rupture of hernia during delivery with recovery, 1 case
(*g*) Death from incarceration of vaginal hernia, 1 case.

ETIOLOGY

The frequency of cystocele and rectocele, other types of vaginal hernia, in multiparous women would seem to lend weight to the theory of the acquired character of vaginal enterocele. That the trauma incident to childbirth must be considered is shown by the fact that of forty-two patients with vaginal hernia, 90.4 per cent had borne children and only four were nulliparas. Associated causes, such as ascites, large cystic tumors of the abdomen and pelvis, falls and unusual

strains during the middle months of pregnancy, have undoubtedly played a part in the development of hernia in patients presenting a predisposition to vaginal enterocele.

When one considers, however, the relative infrequency of vaginal hernia in the presence of such a normal physiologic process as pregnancy, it seems plausible, at least, to presuppose congenital weakness of the muscles and fascia forming the pelvic floor as a predisposing cause.

It was Zuckerkandl,[6] in 1891, who first clarified the embryology and anatomy underlying vaginal enterocele. Just as an inguinal hernia depends to a large extent on a partially open processus vaginalis, so a vaginal hernia also presupposes some original or primary elongation of the culdesac of Douglas as the starting point of a vaginal enterocele or hernia (fig. 7).

The reflection of the peritoneum in Douglas' pouch lies lower in the female than in the male. In the male the reflection extends down to the seminal vesicles, whereas in the female it extends down so low posterior to the uterus that the upper part of the vagina is covered with peritoneum, loosely attached.

Breisky[9] demonstrated in a 3 months female fetus that the pouch of Douglas extends down to the point where the uterovaginal canal still empties into the urethra. If we assume that the müllerian tubercle corresponds with the hymen, we might then assume that the culdesac reaches to the pelvic floor at this period (fig. 8). Ziegenspeck[10] found the culdesac to extend down to the levator ani muscle in two of fifty-six patients examined.

Dickinson,[11] in 1889, pointed out a number of points of resemblance between the inguinal canal and the pelvic floor and vagina. Both are openings into the lower end of the abdominal cavity, and both run out from the cavity at almost right angles to the abdominal pressure. Both canals are covered with two main layers, with a ring in each layer, and with an axis which changes its obliquity depending on the size of the mass distending the passage.

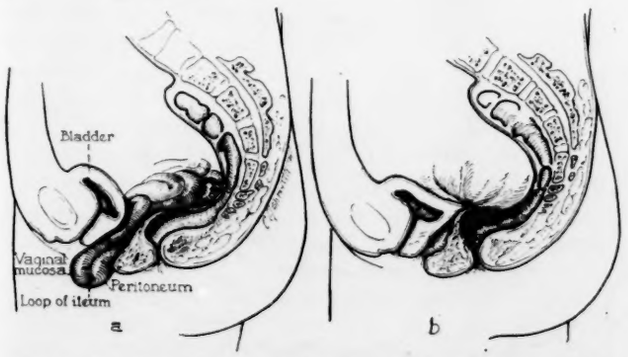

Fig. 5.—(*a*) Sagittal section showing vaginal hernial sac and contents before operation. (*b*) Sagittal section showing method of repair employed. Uterus and cervix removed at previous operations.

Daniel Jones,[12] in 1916, emphasized the relationship of the deep culdesac to prolapse of the rectum and uterus and to rectocele, and described the congenital and acquired type of deep culdesac. The congenitally defective culdesac, which he considered rare, is the type which predisposes to the development of vaginal enterocele during the strain and anatomic relaxation incident to childbirth. It is then not improbable that a failure of the culdesac to ascend to its normal level may account for an abnormally deep culdesac, which certainly, during pregnancy, would throw a wedgelike strain on the openings in the muscles of the pelvic floor.

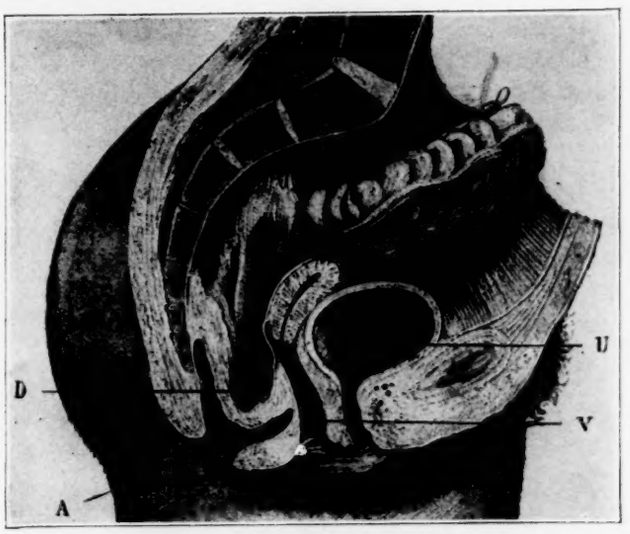

Fig. 6.—Illustration showing hedrocele and culdesac bulging through anterior rectal wall. (From Zuckerkandl: *Deutsche Ztschr. f. Chir.* **31:** 590, 1891.)

SYMPTOMS AND DIAGNOSIS

The symptoms of vaginal hernia are usually those of a rectocele and are not, as a rule, characteristic.

The patient has usually been pregnant, and may give a history of trauma while pregnant. She may complain of a bearing down sensation and, if the hernia is large, of difficulty in getting about because of the pain in the hernial sac. The prone position relieves the symptoms and causes a spontaneous reduction. Coughing, standing or straining aggravates the symptoms.

Frequently one or more surgical attempts have been made to correct the condition under the diagnosis of cystocele or rectocele. When the true nature of the condition has not been recognized and an operation has been done for cystocele or rectocele with perineorrhaphy, the condition promptly recurs as soon as the patient is on her feet. Recurrence shortly after operation is a common complaint of these patients.

On casual superficial examination a vaginal hernia may resemble a rectocele, especially when the patient is in the lithotomy position. Coughing or straining will cause the hernia to bulge with a definite cough impulse as in inguinal hernia, especially if the hernial sac has been digitally reduced into the vaginal vault. The size of the hernia determines vulval protrusion. A rectocele or cystocele may be found in conjunction with a vaginal hernia, and since the majority of the patients have been pregnant, perineal relaxation and laceration may also be an associated finding, as may varying degrees of uterine prolapse. Postoperative vaginal hernias are not considered in this paper.

I used a sign not previously described in conjunction with vaginal hernia, and considered it to be pathognomonic of small intestinal contents of the sac. The sac was digitally irritated and peristaltic waves were seen to course over the surface of the sac.

9. Breisky: Die Krankheiten der Vagina, in Billroth and Luecke: Deutsche Chirurgie, Stuttgart, vol. 60.
10. Ziegenspeck: Ueber normale und pathologische Anheftungen der Gebärmutter und ihre Beziehungen deren wichtigsten Lageveränderungen, Arch. f. Gynäk. **26.**
11. Dickinson, R. L.: The Vagina as a Hernial Canal, Am. J. Obst. & Gynec. **22:** 692-697, 1889.
12. Jones, Daniel: Relation of the Deep Cul de Sac to Prolapse of the Rectum and Uterus, Boston M. & S. J. **175:** 623 (Nov. 2) 1916.

Ward [13] pointed out the possibility that a small enterocele may occasionally be associated with a definite rectocele. Repairing the rectocele without proper consideration for the enterocele leads to an unsuccessful result as far as the patient is concerned.

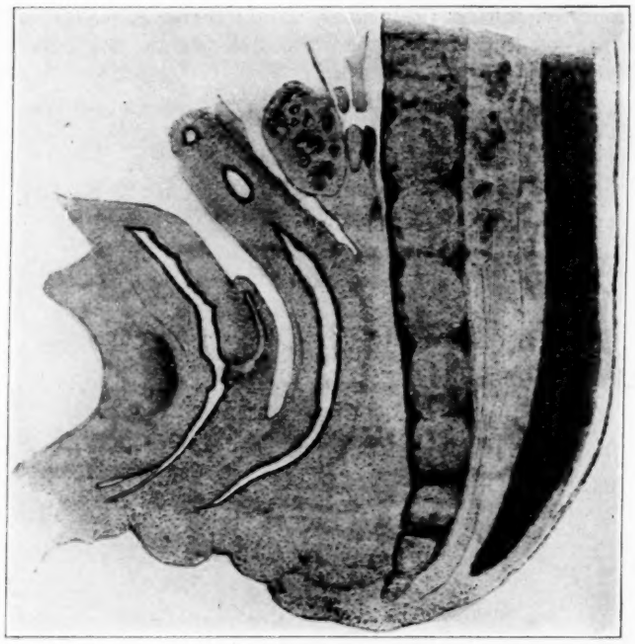

Fig. 7.—Sagittal section of 35 mm. male embryo, showing depth of culdesac at this period. (From Zuckerkandl: Deutsche Ztschr. f. Chir. **31**: 590, 1891.)

In cases in which this possibility might be suspected there is always one constant and typical sign of vaginal hernia. In the presence of such a hernia a digital rectal examination will demonstrate that the soft bulging mass protruding from the posterior vaginal wall is only partly caused by the bulging anteriorly of the rectal wall and that there must be a superimposed sac. This can be definitely established by having the patient give a short, quick cough during the digital examination. A protrusion, independent of an associated rectocele will then be demonstrated. A sound introduced into the bladder will differentiate an anterior vaginal hernia from a cystocele.

Cysts and tumors of the vagina can usually be differentiated from vaginal hernias. Gärtner's cysts may be confusing because they can be reduced under pressure, the fluid returning along a duct to a parovarian cyst in the broad ligament. Pudendal hernias are usually unilateral and covered on the inner surface by vaginal mucous membrane and laterally by the skin of the labium majus.

TREATMENT

Vaginal hernias require surgical treatment and are similar to other hernias in that they tend to increase in size and are not amenable to various types of mechanical supports.

Masson [14] has pointed out that there are three essential steps in the successful surgical treatment of hernia in general and particularly of vaginal hernia: isolation of the sac, disposal of the sac and repair of the defect at the point of egress of the hernia from the abdomen.

13. Ward, G. G.: Technic of Repair of Enterocele (Posterior Vaginal Hernia) and Rectocele, J. A. M. A. **79**: 709-713 (Aug. 26) 1922.
14. Masson, J. C., and Simon, H. E.: Vaginal Hernia, Surg., Gynec. & Obst. **47**: 36 (July) 1928.

The varying conditions under which vaginal hernia is encountered makes a uniform procedure out of the question; however, the foregoing principles must be adhered to for the best surgical results.

The sac may best be isolated through a vaginal approach, using the usual incision for the repair of a rectocele or cystocele, depending on whether the hernia is posterior or anterior to the uterus. The contents of the sac can usually be reduced, leaving the peritoneal lining of the sac apparent.

Through the vaginal approach the sac may be disposed of by pushing its contents into the abdomen, ligating the sac high and excising any superfluous portion. If abdominal section is also contemplated, the sac can be pushed into the abdomen with its contents and the repair of the defect made at the same time. After the abdomen is opened, the sac may be everted and sutured to the posterior wall of the uterus or the redundant portion may be excised.

Repair of the defect at the point of egress may be accomplished from the vaginal approach, by obliterating the cleavage plane through which the hernia emerged. The operation is then completed by approximating the levator ani as in a high perineorrhaphy.

The pelvic floor defect can usually be repaired by obliterating the culdesac of Douglas as in the Moschcowitz operation for the cure of rectal prolapse. Other associated pathologic changes, such as uterine displacements, are also amenable to treatment at the same time. If vaginal hernia has been diagnosed before operation, the repair of the pelvic floor defect and obliteration of the culdesac first makes the perineal isolation of the sac an easier and safer procedure.

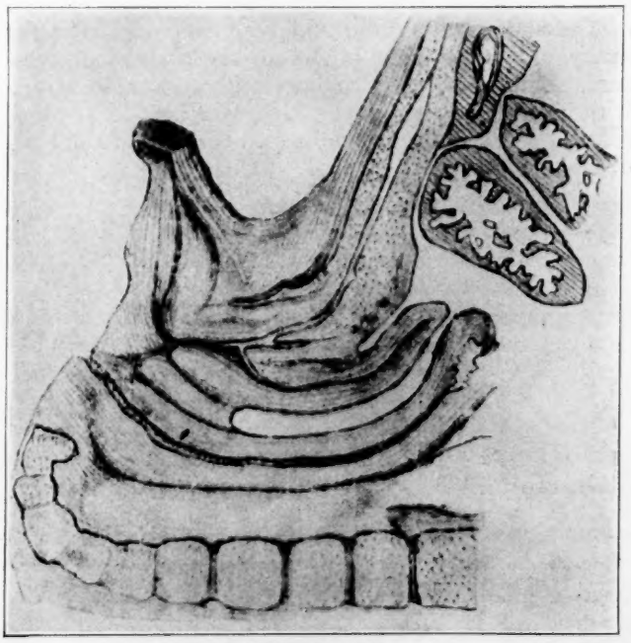

Fig. 8.—Sagittal section of female embryo at end of third month, showing depth of culdesac as compared with uterovaginal juncture. (From Breisky, in Deutsche Chirurgie, vol. 60.)

When vaginal hernia is associated with marked uterine prolapse, a vaginal hysterectomy and repair of the hernia can be carried out successfully at the same time.

Anterior vaginal hernias require obliteration of the vesico-uterine space in order to cure the pelvic floor defect.

CONCLUSIONS

1. Vaginal hernias are rare. The posterior variety are more frequently encountered.

2. The symptoms are largely those of rectocele or cystocele and are not characteristic. Diagnosis is often not made before operation, and repeated unsuccessful operations may reveal the true nature of the diagnosis.

3. The association of enterocele and rectocele must be considered in diagnosis.

4. Congenital weakness of the pelvic floor and the strain superimposed by pregnancy and delivery are predisposing causes of an uncertain etiology.

5. Vaginal hernia requires surgical treatment governed by the principles set down for the surgical treatment of hernias in general. Complicating pelvic conditions often prevent a standardized technic being observed.

410 Taylor Street.

PROLAPSE, CYSTOCELE, RECTOCELE AND TRUE VAGINAL HERNIA

DIAGNOSIS AND TREATMENT

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As the title of my paper indicates, I wish to draw attention to the difference between true vaginal hernia with a sac of peritoneum, which is quite rare except as a postoperative condition, and the condition known as gynecologic hernia. As the latter has no peritoneal sac, I shall speak of it as a false hernia.

The etiologic factors are the same for all types of hernia; namely, abdominal pressure and weakness of the floor of the pelvis. There is no doubt that in cases of the ordinary gynecologic hernia, the suspensory ligaments exercise some useful purpose, but modern authorities agree with Halban that if the floor of the pelvis is sufficiently weakened the ligaments cannot by themselves prevent the tendency to prolapse of the internal genitalia, the posterior wall of the bladder or the anterior wall of the rectum. Furthermore, the ligaments cannot exercise any influence over a tendency to the development of a true vaginal hernia between the bladder and the vagina or between the vagina and the rectum.

All hernias into the vagina may be caused by the same conditions that predispose to hernias elsewhere. If the intra-abdominal pressure is increased sufficiently, a hernia is sure to develop at some point in the abdominal wall. If the floor of the pelvis is weakened by congenitally poor development or as the result of trauma, either directly to the muscle or to the blood or nerve supply, a predisposing cause will exist for the development of one of the types of hernia under consideration. It should be kept in mind that in the upright position the intra-abdominal pressure is always greater in the pelvis than at any point higher.

The floor of the pelvis, as Thompson [1] has noted, is a thick compact mass traversed by clefts or faults, the walls of which are normally in contact but which open to allow material to pass through. Symington [2] stated that in the mesial plane the floor of the pelvis is, as a rule, about 2.5 cm. thick. Laterally, it varies but is always thicker than in the middle; near the lateral wall of the pelvis it is from 5 to 7.5 cm. thick. Muscles and their fascial coverings compose this floor. The most important of these muscles are the levator ani and the coccygeus, representing in human subjects two of the tail muscles of lower animals. The levator ani muscles arise from the posterior surface of the os pubis and their fibers pass backward lateral to the urethra, vagina and rectum, to their insertion in the sacrum and coccyx. Fibers passing across between the urethra and vagina and the vagina and rectum constitute the pubo-urethralis and pubovaginalis tissue, respectively (fig. 1). The levator ani is, according to Derby,[3] one of the most variable muscles in the body. Congenital weakness, or absence of these intercommunicating fibers, provides the predisposing condition in the development of vaginal hernia in the event of severe strain. Such a strain comes during pregnancy when the tissues of the pelvis become lax and congested, and

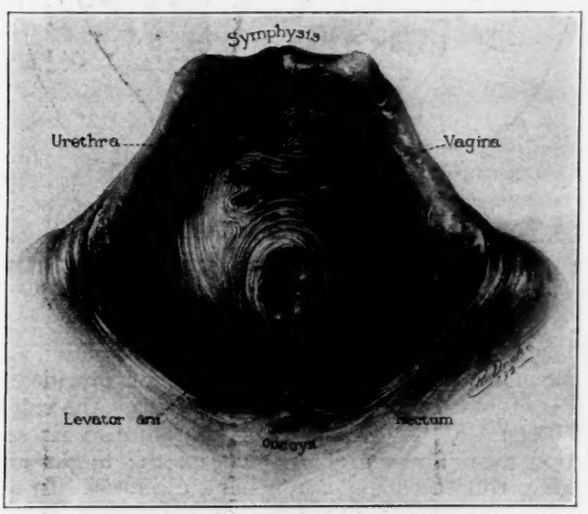

Fig. 1.—Anatomy of the pelvis.

the trauma of delivery is superimposed. From a consideration of the relative strength of the floor of the pelvis in its median and lateral portions it will be readily seen that these hernias are likely to occur in the median line, and but rarely, if ever, on either side, unless they pass through or entirely lateral to the levator ani muscles, as in the pudendal and perineal types of pelvic hernia.

The difference in the pathologic picture of a true vaginal hernia and any of the false type is striking, and can best be depicted by illustrations (fig. 2). True hernias are spoken of as anterior and posterior, depending on whether the peritoneal sac which is present beneath the vaginal mucous membrane dissects along the anterior or posterior vaginal wall. Under this classification should also be added a much larger group of postoperative hernias, developing after hysterectomy. False hernias of the gynecologic type have no peritoneal sac. When the protrusion is in the anterior wall of the vagina it is called cystocele. When the rectum bulges into the vagina it is a rectocele, and when the uterus

From the Division of Surgery, the Mayo Clinic.
Read before the Section on Obstetrics, Gynecology and Abdominal Surgery at the Eighty-Third Annual Session of the American Medical Association, New Orleans, May 13, 1932.

1. Thompson, Peter, quoted by Cameron, John: The Fascia of the Perineum and Pelvis of the Female, with Special Reference to the Mechanical Supports of the Pelvic Viscera, J. Anat. & Physiol. **42**: 438, 1907-1908.

2. Symington, Johnson: A Contribution to the Normal Anatomy of the Female Pelvic Floor, Edinburgh M. J. **34**: 788, 1888-1889.

3. Derby, D. E.: Pelvic Muscles and Fasciae, J. Anat. & Physiol. **42**: 107, 1907-1908.

itself sinks to a lower level than normal in the vagina, it is uterine prolapse. A fairly accurate idea of the condition is obtained by grading the hernias 1, 2, 3 or 4 according to their size. I shall not consider the types separately as it is seldom that one type exists without some tendency toward the others. If the type is pronounced (graded 3 or 4), it is easily recognized.

In the presence of a large cystocele or rectocele the patient will often have to make pressure on the walls of the vagina in order to empty the bladder or rectum, and in the presence of complete prolapse, or procidentia as it is often called, the uterus will lie outside the vulva, and because of the venous stasis, exposure to air and friction as the result of rubbing on the thighs and clothing, will become edematous and ulcerated. In my experience, however, carcinoma of the cervix seldom develops in such cases. Early in the development of these hernias, however (size graded 1 or 2), they are often overlooked as the cause of abnormal menstruation, bearing down, uncomfortable feeling in the pelvis and lumbosacral backache. As a rule they develop as the direct result of trauma at childbirth, but occasionally one or the other of the conditions, especially a cystocele, will be found without any tendency toward uterine prolapse, usually in nulliparous women. In such cases increased intra-abdominal pressure and poor development in the anterior muscular part of the pelvic diaphragm probably are the predisposing causes.

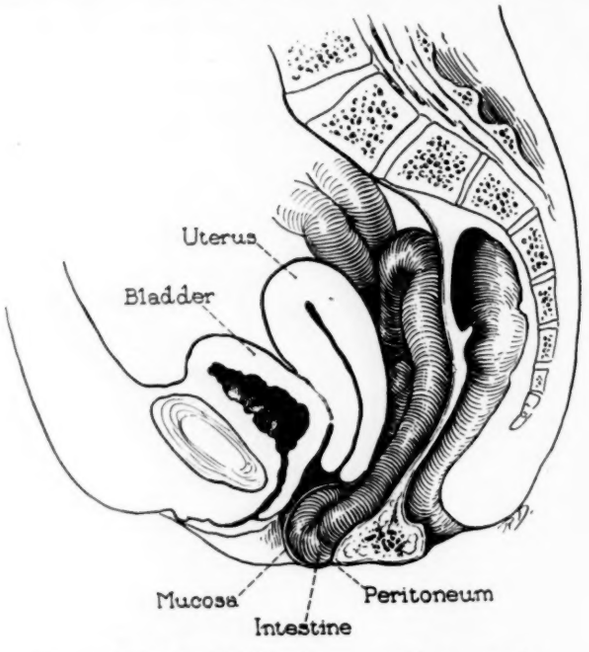

Fig. 2.—Posterior vaginal hernia; no rectocele or cystocele.

Urethroceles and diverticula of the urethra are frequently mistaken for cystoceles.

It is not my purpose here to consider the treatment of prolapse of the uterus, cystocele and rectocele, since such cases as a rule should be considered separately, and the type of operation should take into consideration the extent of the lesion, the patient's age, general health, marital state, etc.

However, I wish to mention it in order to condemn operations for abdominal fixation and shortening of ligaments alone, or in combination with perineorrhaphy for prolapse and retroversion when associated with cystocele. Unless the defect in the anterior part of the pelvic diaphragm is repaired or strengthened the cystocele will recur, and the cystocele, not the prolapse, causes most of the symptoms, particularly among young women who are on their feet a great deal and engaged in active work. I have seen several such cases in which the cystocele was apparently cured for a few months, then recurred, and the patients came to the clinic with cystoceles graded 3 or 4, and with the cervix presenting at the vulva as the result of elongation; the fundus, however, was still firmly fixed to the anterior abdominal wall (fig. 3).

Another condition that should be mentioned is herniation of the vault of the vagina, following either abdominal or vaginal hysterectomy. If the perineum can be satisfactorily repaired, temporary relief can at least be assured by the wearing of a ball pessary, but to secure satisfactory permanent cure, a Le Fort type of plastic operation or complete obliteration of the vagina is often necessary.

In 1926, my interest in true vaginal hernias was first aroused by recognizing one at the time of operation, supposedly for a rectocele. Shortly afterward this case and four others seen up to that time at the Mayo Clinic were reported. Since then operation has been performed in eleven additional cases.

The condition was probably first reported by Cooper [4] in 1804, and about the same time Garengeot [5] also pointed out that cystoceles, rectoceles and vaginal hernias differ. Sweetser,[6] in 1919, reported one case. Miles,[7] in 1926, in a critical review of the literature, analyzed nine reported cases and added two of his own. His classification is as follows:

All hernias which pass through the floor of the pelvis are classified as pelvic hernias. These are subdivided, according to their point of egress: pudendal hernias when they present in the labia, perineal hernias when they present in the perineum, and vaginal hernias when they present in the vagina. He subdivided vaginal hernia into the anterior and posterior varieties, depend-

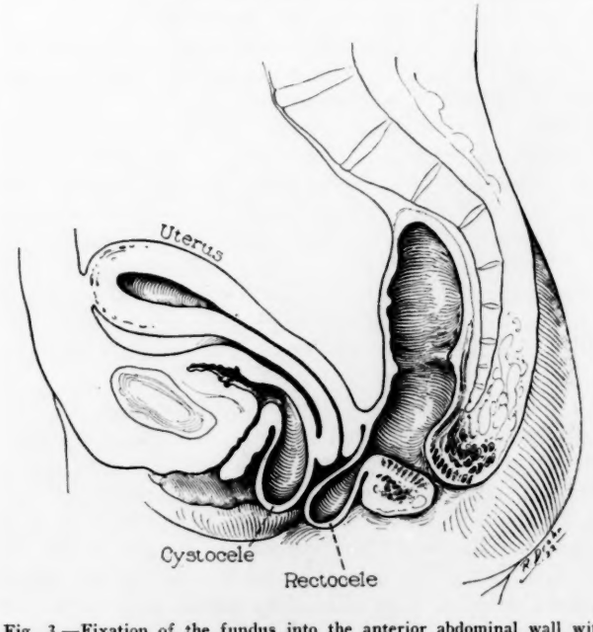

Fig. 3.—Fixation of the fundus into the anterior abdominal wall with elongation of the cervix and recurrence of cystocele.

4. Cooper, Astley, quoted by Barker, Fordyce: Vaginal Hernia, or Vaginal Enterocele, Am. J. Obst. **9**: 177 (June) 1876.
5. Garengeot, quoted by Barker.
6. Sweetser, H. B.: Vaginal Hernia, Ann. Surg. **69**: 609 (June) 1919.
7. Miles, L. M.: Pelvic Hernia: Report of a Case of Posterior Vaginal Hernia, Surg., Gynec. & Obst. **42**: 482 (April) 1926.

ing on the relationship which the sac bears to the uterus. He did not group postoperative vaginal hernias separately; these form a distinct type and should be included in a third subdivision in this classification (fig. 4).

TREATMENT

The treatment of true anterior and posterior vaginal hernia is surgical. Untreated, the hernia tends to enlarge and the use of palliative measures, such as supports of various types, has proved unsatisfactory. No uniform procedure has been adopted in treatment because true vaginal hernia occurs so seldom, and because coexisting malpositions of the pelvic organs vary so greatly in different cases. However, certain well recognized principles governing the treatment of hernia in general must be adhered to in dealing with this type of hernia. Three measures must be accomplished: isolation of the sac, disposal of the sac and repair of the defect at the point of egress of the hernia from the abdomen. The means by which these ends can best be accomplished depend somewhat on the condition and position of the pelvic organs.

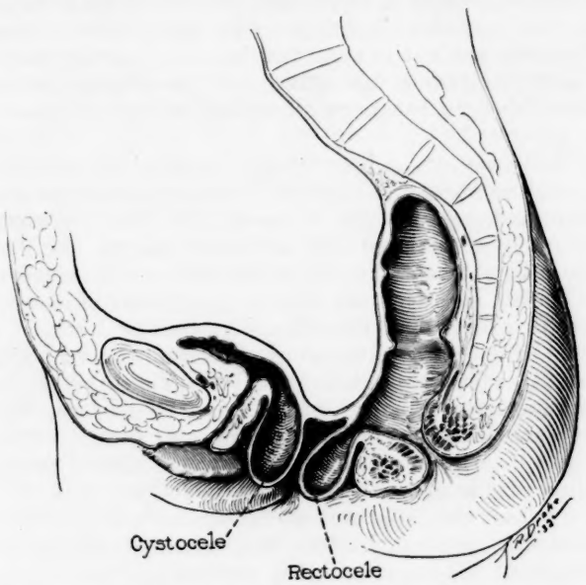

Fig. 4.—Postoperative vaginal hernia with cystocele and rectocele.

Isolation of the Sac.—The sac may be most successfully isolated through a vaginal incision. Sometimes a vaginal flap is dissected free before the hernia is discovered, and it remains only to complete the isolation of the sac through this incision. If true vaginal hernia has been diagnosed clinically, the usual incision for the repair of a rectocele or cystocele, depending on whether the hernia is anterior or posterior, should be made, and the sac isolated.

Disposal of the Sac.—The hernial sac may be disposed of either by the vaginal or the abdominal route. When the operation is performed through a vaginal incision, the contents of the hernia are pushed well up into the abdomen, the neck of the sac is ligated and the superfluous portion is excised. If a combined type of operation is to be used the hernia is reduced, the sac is inverted and pushed up into the abdomen, and the repair of the perineum is completed in the usual manner. When the abdomen is opened the sac is completely inverted and sutured to the posterior wall of the uterus. This may also be done in some cases by opening the peritoneum in front of the uterus and drawing the uterus and hernial sac through the opening and stitching them together, or sometimes the excess tissue of the sac is excised, and the opening is closed by a purse-string suture.

Repair of the Defect at the Point of Egress of the Hernia.—If the neck of the sac is easily accessible, such repair of the defect may occasionally be accomplished through the vaginal incision. When the sac is disposed of in this manner, the levator ani muscles are drawn together and the operation is completed as a high perineorrhaphy. However, repair of the defect in the floor of the pelvis is most satisfactorily carried out through an abdominal incision. A series of purse-string sutures is utilized to obliterate the culdesac of Douglas (fig. 5) when the hernia is posterior, and the vesico-uterine space when the hernia is anterior to the uterus. If there is no objection the interposition operation of Watkins and Wertheim for cystocele can be used, and is a very satisfactory way of treating an anterior vaginal hernia. In some cases of posterior vaginal hernia the colon may be utilized to cover the weak point in the floor of the pelvis. The operation may then be completed by the correction of any uterine displacement that may be present. When the patient has passed the child-bearing age, the uterus may be fixed into the anterior abdominal wall.

Special Cases.—Vaginal hernias in association with certain types of pelvic displacement require special types of repair. In cases of posterior vaginal hernia associated with uterine prolapse of advanced degree, the patient being near or past the menopause, an operation may be performed entirely by the vaginal route. A vaginal flap is dissected free preliminary to perineorrhaphy; the hernial sac is isolated and disposed of as described; a Mayo vaginal hysterectomy is performed, the broad ligaments are sutured together well posteriorly and the uterosacral ligaments and the sigmoid anchored to them. The operation is completed by doing a perineorrhaphy, or the vagina may be obliterated with approximating sutures of chromic catgut. Two cases in this series were treated successfully in this manner.

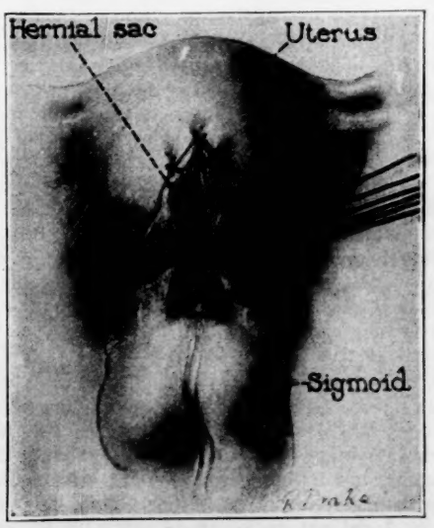

Fig. 5.—Fixation of the sac to the posterior wall of the uterus and obliteration of the culdesac with purse-string sutures.

The abdomen may be explored preliminary to the vaginal operation when abdominal complications make it desirable. The neck of the sac is closed by a series of purse-string sutures, and the culdesac of Douglas is

obliterated at the same time. Isolation of the sac and removal of its fundus, as well as any plastic operation on the vagina, may be accomplished as a second stage either at this time or later.

When the first stage of the repair is performed through a vaginal incision and the second stage is to be performed through an abdominal incision, the second stage should be carried out at the same time or before the patient is permitted to be up, otherwise the hernia may recur as soon as the patient stands.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. BUEERMANN AND MASSON

DR. HAROLD E. SIMON, Birmingham, Ala.: Vaginal hernia is an example of a surgical oddity. Within recent years much interest has been taken in such conditions, conditions long recognized but considered so rare as to be of little practical importance. With more general knowledge of these conditions, they are more often being recognized and differentiated from the more common diseases with which they are apt to be confused. Recognition of vaginal hernia prior to operation is so essential to adequate treatment that it seems relevant to emphasize the most important diagnostic points. One of the most suggestive symptoms is the persistence of the condition after an attempted repair of a supposed cystocele or rectocele. Doubtless it is undiagnosed more often than not. With more critical examination of the patient who presents a mass that bulges into the vagina, many more cases of true vaginal hernia are being recognized. Unless complicated by adhesions or neoplasms, the hernia reduces spontaneously when the patient lies down. Manual reduction may be accompanied by a gurgling sound or sensation when the contents of the hernial sac include intestine. The diagnosis, however, rests largely on the rectal examination. In vaginal hernia it can be demonstrated that the bulging of the rectum constitutes only a part of the total mass; in rectocele it constitutes the major portion of the mass. Attention has been called to the three essential steps in the repair of any hernia. Any procedure that omits any one of these essentials results in failure to cure. When the condition is unrecognized and treated as a rectocele or cystocele, none of these steps are carried out except perhaps the third one, and then to a partial degree only when a high perineorrhaphy is performed. The hernia reappears as soon as the patient stands; it cannot be said to recur because it never has been repaired. There can be no routine treatment for this type of hernia because of variations in degree and the presence or absence of various abnormalities in related structures and organs. Any procedure or set of procedures that accomplishes the three essential steps outlined will result in cure. Dr. Bueermann's thorough review of the literature is a valuable contribution to the study of vaginal hernia. It is of academic interest that the term "vaginal hernia" is probably preferable to "vaginal enterocele" to designate this condition, since the latter term might be construed to include rectocele and cystocele as well as true vaginal hernia.

DR. W. H. BUEERMANN, Portland, Ore.: The first case of vaginal enterocele which I described was discovered shortly after reading Dr. Masson's original paper in 1928, undoubtedly because this condition was called to my attention at that time. I recognized the condition not only in the first and the second patient with a posterior type of hernia, but also in the third case, which I did not discuss, a patient with an anterior type of vaginal hernia. In this patient a diagnosis was made from the patient's history and verified at the time of the examination.

Natural and Artificial Alkaloids.—Investigations so far have tended to show that the natural alkaloids are superior to artificial alkaloids, whether as therapeutic or as pharmacological agents; so much so, that many have adopted the view that no artificial alkaloid, especially if unrelated to the natural alkaloid, will prove equal to the natural alkaloids as therapeutic agents. While the evidence at present may support that view, I think it is nevertheless fallacious.—Gunn, J. A.: Remarks on the Outlook of Research in Therapeutics, *Brit. M. J.* **2**:391 (Aug. 27) 1932.

PRIMARY ACTINOMYCOSIS OF THE TONGUE

WITH REPORT OF TWO CASES

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Dermatologists are frequently called on by members of other specialties as well as by lay clientele for opinion, diagnosis and advice regarding lesions of the tongue. It is for this reason that this review of primary actinomycosis of the tongue, with reports of two more cases, is presented.

Many authors had previously described or mentioned conditions in animals which we may presume to have been actinomycosis, but it was in 1877 that Bollinger [1] definitely established the organism named the "ray fungus" or "Actinomyces" as the cause of "lumpy jaw" of cattle. The following year, actinomycosis in man was found to be due to the same organism by Israel.[2]

Judging by the number of cases of primary actinomycosis of the tongue, only fifty-five since the original report of von Hacker [3] in 1885, one would be inclined to view this entity as rare. However, since New and Figi,[4] have been able to report twelve cases from the Mayo Clinic alone, it seems probable that many cases are missed through error in diagnosis, the lesions being treated as pyogenic abscess, and cured without the true nature of the infection being realized.

The infection is apparently often primary in the tongues of some domestic animals, cattle showing from 18 to 29 per cent involvement and hogs 5 per cent, according to various reporters. These animals are no doubt in almost constant contact with a source of infection.

Bonnet [5] has propounded the following reasons for the rarity of primary actinomycosis in the human tongue: 1. The tongue is protected by the lips, gums and teeth. 2. The tongue is composed almost entirely of mucosa and muscle, whereas the ray fungus prefers connective tissue.

There are two theories regarding the type of Streptothrix and mode of introduction of the organism in producing this disease in the human tongue:

1. The organism is an aerobic streptothrix, easily grown at room temperature and related to the mycelial parasites of grasses in marshy regions. It has its normal habitat inside the husks or sheaths of barley or other grains or grasses, and is easily conveyed into the tongue when a beard or blade from these plants pierces the lingual mucosa (Bostroem [6]). This theory has some support in the government report [7] which shows that animals pasturing on low land have the disease more frequently than those on high land. It has also been

Studies and Contributions of the Department of Dermatology and Syphilology, University of Michigan Medical School, service of Dr. Udo J. Wile.
Read before the Section on Dermatology and Syphilology at the Eighty-Third Annual Session of the American Medical Association, New Orleans, May 11, 1932.

1. Bollinger, quoted by Bevan, A. D.: Actinomycosis, Ann. Surg. **41**: 641, 1905.
2. Israel, J.: Neue Beobachtungen auf dem Gebiete der Mykosen des Menschen, Arch. f. path. Anat. u. Physiol. **74**: 15, 1878.
3. von Hacker: Actinomycose der Zunge, Anz. d. k. k. Gesellsch. d. Aerzte in Wien, 1884-1885, p. 185.
4. (*a*) New, G. B., and Figi, F. A.: Am. J. M. Sc. **163**: 507, 1922. (*b*) Figi, F. A.: S. Clin. North America **6**: 1343-1357, 1926.
5. Bonnet, D.: Internat. Clin. **3**: 34, 1921.
6. Bostroem: Untersuchungen über die Actinomykose des Menschen, Beitr. z. path. Anat. u. z. allg. Path. **9**: 1-240, 1890.
7. U. S. Government Report: J. A. M. A.

shown that the ray fungus can be demonstrated almost constantly in the grain beards which are frequently found in the tonsillar crypts of slaughtered hogs.

2. The organism is an anaerobic streptothrix, normally inhabiting the mouth (Wolf and Israel[8]). It is especially likely to lie dormant in carious teeth, and enter the tissues of the tongue with the piercing trauma of a grain beard, grass stem or splinter of wood, or enter subsequent to the trauma. This anaerobic streptothrix grows best at body temperature, and is difficult to cultivate. It is definitely the type of organism most often found in clinically typical actinomycosis, which explains the frequent failure to obtain growth on ordinary slant tubes of Sabouraud's mediums.

It seems that the most frequent location of the actinomycotic infection in the tongue, that is, the anterior third, involving one side or the other, would point to trauma from the teeth (canine?) or trauma from a foreign body caught between the teeth and forced into the tongue as playing a major rôle in the entrance of the organism. Foreign bodies, such as grain beards, have been demonstrated in lingual nodules by Fischer, Jurinka, von Baracz, Schartau, Harms, Kockel, New and Figi.[4a] Actinomycosis of the esophagus has been ascribed to puncture by a spine of grain which carried Actinomyces (Larger[9]).

Including our two cases, fifty-five cases of primary actinomycosis of the tongue are now on record. Of these, only thirty-six cases, or 65.4 per cent, are proved and checked by microscopic observations.

The disease is much more common in males than in females. Among all the cases recorded, there were forty-two males (76.4 per cent) and thirteen females (23.6 per cent).

Analysis of the age incidence of the infection reveals that it occurs wholly in adult life, as far as is known. Only two cases occurred below the age of 20 (both of these patients were 18 years old), and three above 70 years. Fifteen patients, or 27.3 per cent, were between 41 and 50 years of age.

In only forty-three of the fifty-five cases recorded to date was the occupation stated; thirty of these patients were farmers, farmers' wives or farm hands. Other occupations were sporadically affected. A physician had the habit of moistening his finger with his tongue while inspecting meat (Maydl,[10] 1889). A judge chewed grass while playing golf. The chief etiologic factors of note that are commonly found are: the habit of chewing hay or grain straw, and irritation or trauma to the tongue by a jagged tooth.

CLINICAL COURSE

The majority of patients have been found to complain of a painful swelling of the tongue, usually of a week's to several weeks' duration. Early this swelling may present as a solid, rounded, slightly tender, circumscribed nodule in the tongue, often with no great change in the overlying mucosa. The location is most often in the anterior one third of the tongue, often to one side of the midline near the tip. As the inflammatory change progresses, the nodule tends to increase in size and become softer, with purplish discoloration of the mucosa over it. It becomes painful to palpation and on active motion of the tongue. Frequently one or more small sinuses form, from which thin yellow pus discharges from time to time. As is usual in this disease elsewhere, the pus frequently contains from pinpoint to pinhead sized sulphur granules made up of colonies of Actinomyces, which can be readily recognized when pressed out on a slide under a cover-slip and examined with a reduced light through the microscope. In rare cases, the abscess formation may burrow into the base of the tongue and eventually point in the submental region. Most cases, however, have responded to local therapy miraculously well. Only one death has been recorded following primary actinomycosis of the tongue; this was from "multiple abscesses of the neck and jaw" one and one-half years after incision and curettement of the tongue lesion, with rapid local healing.

Even fairly early in the disease the submaxillary nodes are frequently enlarged and tender, but have not been shown to contain Actinomyces, secondary pyogenic infection apparently inducing the adenitis.

DIAGNOSIS

Patients who have presented themselves early, before suppuration and drainage have appeared, have presented the possible clinical picture of a granuloma (gumma, tuberculosis, actinomycosis), neoplasm (carcinoma), infected cyst or simple pyogenic abscess of the tongue. Solitary gumma does not have a predilection for the anterior one third of the tongue as does actinomycosis, but may occur anywhere, usually on the dorsum near the midline, and tends to be painless and to present the characteristic punched-out ulcer of infarction. There may be other concomitant clinical or serologic evidence of syphilis, and biopsy shows the histopathologic characteristics of syphilis. Those gummas which are sometimes found with "syphilitic sclerosing glossitis" present the same characteristics in morphology.

The diagnosis of carcinoma of the tongue has been entertained clinically in many of the cases which have finally been shown to be actinomycosis; one of my cases was referred as such. Carcinoma usually presents as an ulcerated nodule with marked underlying infiltration and fixation, an everted, pearly, hard, translucent, cartilaginous-like border which bleeds on manipulation, and a slightly purulent, deep granulating base. After the neoplasm has been present for months, regional, stony hard, fixed lymph node metastases are found. Carcinoma quite commonly occurs in the sclerosed tongue of a patient with old syphilis.

Tuberculosis occurring on the tongue is practically always secondary to and necessarily associated with marked pulmonary, and frequently laryngeal, involvement. It presents as a painful nodule with eventual ulceration, commonly linear, simulating a fissure; in the border of the ulcer, pinhead-sized white or yellowish tubercles are seen. Abundant pus is not often seen.

An infected cyst, at the time it is seen, may obviously present the same morphologic characteristics as does an actinomycotic nodule; the history of a long endured noninflamed swelling is of value in proving this entity. The same is true of simple pyogenic abscess as regards its appearance; careful microscopic examination of pus or detailed histopathologic study is necessary to differentiate the latter conditions from actinomycosis. A single examination of pus from a sinus or incised nodule does not suffice; all the broken-down tissue must be curetted out, saved and carefully examined if the true nature of the lesion is to be determined.

8. Wolf and Israel, quoted by Figi (footnote 4*b*).
9. Larger, cited by Weidman, F.: Am. J. M. Sc. **177**: 832, 1929.
10. Maydl, K.: Ueber Actinomykose der Zunge, Internat. klin. Rundschau **3**: 1713 and 1756, 1889.

PATHOLOGY

The primary actinomycotic involvement of the tongue presents the same histopathologic changes as elsewhere: early a solitary nodule made up of purulent granulation tissue, fairly well walled off, with central liquefaction necrosis. It is in this central necrotic area of the nodule that the colonies of Streptothrix are found, indicating the necessity of examining all material curetted out after incision of a fluctuant abscess, or of serial sections through an excised nonfluctuant nodule, to establish a diagnosis pathologically. Without the demonstration of the organism in the section, in pus or culturally (the latter ordinarily being difficult), the diagnosis is not established.

The solitary nodule enlarges, eventually presents an area of softening, points and drains through a small sinus, usually on the dorsum of the tongue near the tip. At this time smaller, satellite nodules, which subsequently become abscesses, may form around the original one. Occasionally a diffuse multilocular lingual abscess with multiple discharging sinuses forms. The

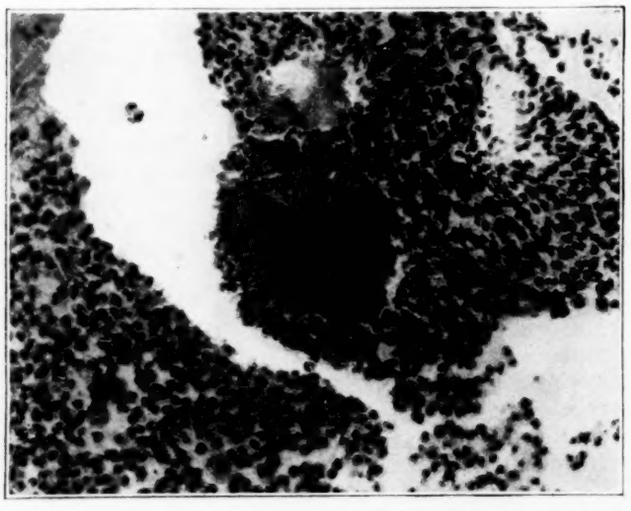

Fig. 1 (case 1).—Colony of Actinomyces in central part of nodule excised. Hematoxylin and eosin stain.

eventual end in untreated patients is external rupture and drainage in the submental region or extension to the structures of the neck.

PROGNOSIS

In seventeen of the fifty-five cases reported to date the outcome is unknown, chiefly because it was not stated in the reports. In the remaining thirty-eight cases there was one death, from "multiple abscesses of jaw, neck and chest" occurring one and a half years after the onset of the primary lingual infection. The remaining thirty-seven cases on record have all been cured, with no recurrence or extension to other parts of the body. In other words, if actinomycosis is suspected in a lesion of the tongue, the proper diagnostic measures are employed and appropriate treatment is instituted, the prognosis for local healing and for life is excellent.

TREATMENT

In those cases which have been seen very early, presenting a firm small nodule in the tongue, excision and primary closure followed by roentgenotherapy (or radium) applied to the tongue, with fairly large doses of potassium iodide internally, has practically always resulted in a permanent cure. Our first case presented a probable granulomatous recurrence twenty-one days after excision (no x-rays used at the time); the "recurrence" involuted promptly with roentgenotherapy and potassium iodide given internally.

It has been found that when a frank abscess or multiple sites of fluctuation with sinuses appear, incision of the abscesses to establish drainage is necessary. The abscess walls should be curetted, the curettings saved and the pus obtained for careful pathologic search for ray fungus colonies; in addition, a portion of the specimen should be used for aerobic and anaerobic culture. It is widely recommended that after incision the abscesses should be swabbed out daily with half-strength tincture of iodine and a mouth wash (1:4,000 potassium permanganate) employed three times a day. At this stage local roentgen or radium therapy to the tongue has been used almost routinely of late years, beginning soon after incision. Although much mention is made of the use of x-rays and radium in this condition, practically no mention is made in the case reports as to dosage. In one of my cases, lightly filtered x-rays, with from 100 to 125 roentgens (one-third erythema dose) weekly for four or five doses proved sufficient; in the other case, one dose of 300 roentgens, well filtered, sufficed. Potassium iodide internally has been used in most cases on record: Doses of 30 grains (2 Gm.) three times daily, increasing to 90 grains (6 Gm.) three times daily, were effective in the cases reported here. If submental abscess nodule formation occurs by extension, daily opening of fluctuant regions and the insertion of iodoform gauze drains have been found necessary; when this occurs, the x-rays should be directed toward the base of the tongue via the submental approach as well as to the dorsum (cross-fire). The use of copper sulphate stick locally and one-fourth grain (16.2 mg.) doses by mouth are recommended, but I cannot judge the value of this treatment.

In 1922, New and Figi brought the total number of cases reported to thirty-eight. Cases have since been recorded by Grupen,[11] Barlow,[12] Banister,[13] Figi,[4b] Wanamaker,[14] Mitchell[15] and Venetianer.[16] I wish to add two more cases, bringing the total to fifty-five cases, thirty-six proved microscopically.

REPORT OF CASES

Case 1.—J. A. W., a farmer, aged 55, entered the clinic Oct. 22, 1929, complaining of a lump on the tongue. It had appeared ten days before as a pea-sized nodule and had increased slightly in size. It had been a little sore and had caused transient stinging sensations. Later inquiry revealed that the patient frequently chewed hay or various grain straws. The rest of the history revealed nothing pertinent.

The general examination gave quite normal results. There was slight dental caries. On the right side of the tongue, 2 cm. from the tip, there was a bean-sized nodule situated deeply in the muscular layer. The overlying mucosa on the dorsum was slightly thinned but not discolored. The nodule was quite firmly indurated, being quite discrete from the surrounding tissue. It was practically painless on manipulation.

The Kahn test of the blood was negative.

The lesion was excised the day of entry. Grossly, it was a firm encapsulated nodule, 1 cm. in diameter, with a little pus in the center. Pathologic examination showed the typical purulent granulation tissue and colonies of Actinomyces (fig. 1).

11. Grupen, J.: Deutsche Ztschr. f. Chir. **183**: 286-287, 1923.
12. Barlow, R. A.: Laryngoscope **35**: 314-316 (April) 1925.
13. Banister, J. M.: Ann. Otol., Rhin. & Laryng. **35**: 495-501 (June) 1926.
14. Wanamaker, A. T.: Tr. Am. Laryng., Rhin. & Otol. Soc. **34**: 446-449, 1928.
15. Mitchell, A.: Clin. J. **58**: 608 (Dec. 18) 1929.
16. Venetianer, P.: Zentralbl. f. Chir. **58**: 1625-1626 (June 27) 1931.

Sutures were removed two days after excision, the wound appearing to be in good condition. Twenty-one days after excision the patient returned, presenting at the anterior end of the scar on the dorsum an indurated, pea-sized, circumscribed swelling which caused a subjective tingling sensation. He was placed on potassium iodide internally, starting with 30 grains three times daily and increasing to 90 grains three times daily. Roentgenotherapy was given as follows:

November 13: Recurrent actinomycosis of the right side of the tongue. One hundred and thirty kilovolts, 5 ma., 30 cm. distance, 4 gage aluminum filter, 125 roentgens.

November 20: No clinical change. Same set-up, 125 roentgens.

December 9: Nodule less noticeable. Same set-up, 1 A 1 filter, 125 roentgens.

Jan. 2, 1930: Only a little local fibrosis left. Same set-up, 100 roentgens.

January 30: Entirely healed and quiescent.

The patient was last seen Jan. 27, 1932. At this time there was a small depressed linear scar near the tip of the tongue, with no inflammatory signs.

CASE 2.—E. M., a farmer, aged 52, came to the clinic Nov. 4, 1931, complaining of a sore tongue. Two weeks before, the whole tongue had suddenly become painful and this had persisted, with a burning sensation all through the mouth. The pain had not subjectively localized itself to any part of the tongue. Only soft foods had been taken since the onset, but the patient felt well generally and believed that he had not lost weight or strength. A few days before, his referring physician had lanced the right side of the tongue, but no drainage had followed. Otherwise the history was irrelevant. After examination the patient said that he frequently chewed hay or various grain straws.

General examination revealed a well preserved man of 52. There was a sharp, carious, slightly malplaced upper right canine tooth, which was in contact with the right side of the

Fig. 2 (case 2).—Nodule on the right side of the tongue, with sinus on dorsum, before treatment.

tongue when at rest. On the right side of the tongue, near the tip, there was a nodule about the size of a pigeon's egg (fig. 2). Its surface was deep purplish red and smooth. On palpation the nodule was quite firm, slightly lobulated and very painful. On the dorsum, just to the right of the midline and 4 cm. back from the tip, there was a small sinus. On pressure a few cubic centimeters of yellow pus containing pinhead-sized "sulphur granules" was expressed. These granules, when placed on a slide and crushed with a cover slip, proved to be made up of colonies of Actinomyces (fig. 3). The temperature (by mouth) was 99.4 F. The white blood cells were 6,000; hemoglobin, 82 per cent. The Kahn reaction of the blood was negative.

On November 5, the abscess nodule was deeply incised and the wound left open. The patient was started on large doses of potassium iodide by mouth, which were increased to 60 grains (4 Gm.) three times daily. The incision was swabbed

Fig. 3 (case 2).—Sulphur granule crushed under cover slip, made up of many colonies of Actinomyces.

out daily with one-half strength tincture of iodine. Roentgenotherapy was given as follows:

November 9 (four days after the incision): One hundred and forty kilovolts, 5 ma., 25 cm., 1 gage aluminum, ¼ gage copper filter, 300 roentgens to the right dorsum of the tongue.

December 8: Lesion healed.

Jan. 12, 1932: Lesion healed. Potassium iodide stopped.

No more roentgenotherapy was given. There has been no recurrence to date.

SUMMARY

1. The literature on primary actinomycosis of the tongue is reviewed.
2. Two cases are added to the literature.
3. An efficient form of therapy is outlined.

ABSTRACT OF DISCUSSION

DR. BEDFORD SHELMIRE, Dallas, Texas: The rarity of actinomycosis of the tongue is not to be expected when one considers that this fungus is a frequent inhabitant of the mouths of many normal individuals. The rarity of the lingual localization of the disease is more apparent than real. Most of the reported cases have been diagnosed by the pathologist on routine examination of tissue excised from a lingual tumor. As pointed out by Dr. Cameron, two types of lingual actinomycosis occur. One is the acute actinomycotic abscess, which closely resembles the ordinary acute pyogenic lingual abscess. As the ray fungus does not form pus, the acute abscess of this type is probably due to the invasion of an actinomycotic nodule with ordinary pus-producing bacteria of the mouth. Pus examined from these acute actinomycotic abscesses in the routine manner will often reveal none of the diagnostic granules. The best method is to curet the abscess walls lightly and examine the contents of the curet under the microscope. Routine culture of the pus is not satisfactory, since Actinomyces is grown with difficulty by ordinary culture methods. When a biopsy is done, a correct diagnosis may not be made since the actinomycotic granules are few in number in such cases and their demonstration may be possible only by serial section of the entire lesion. The other type of actinomycosis of the tongue is the chronic nodular and often ulcerative lesion, which clinically resembles carcinoma, gumma and certain types of lingual tuberculosis. The chief thing to remember is that actinomycosis of the tongue occurs and that this should be considered in the differential diagnosis.

The methods employed to diagnose the acute actinomycotic abscess should be instituted. In actinomycosis of any site, the granules which are expelled from the various sinuses may be absent for days and then come in a veritable shower, only to disappear after a variable interval. When biopsy of the lesion or curettage of the sinus walls is not done, a daily vigil over an extended period is often necessary to demonstrate the causative fungus granules.

DR. FRED D. WEIDMAN, Philadelphia: I was rather slow to learn that actinomycosis in man behaves somewhat differently than in animals. I used to think that the condition in the two was the same; that is, lumpy jaw. No case with lumpy jaw has been described in the United States; all the cases reported in this country were carefully analyzed by Sanford, and no case of this type was recorded. The kind one sees in man affects the soft tissues—the tongue, periosteum and perhaps the other soft tissues of the face. It may be that the organism is different in man and in animals, Actinomycosis bovis probably being responsible for the disease in cattle, with Actinomycosis israeli responsible for the disease in man. The author brought up the importance of careful selection of material for laboratory study. Often the pathologist is hampered because the material has not been properly taken. I believe a good many clinicians think the pathologist is a superman and because he has a microscope can accomplish anything. That is not a fact. When selecting tissue for biopsy he must try to visualize the processes going on in the tissues, try to identify the part of the lesion that is most active and representative, where the organism has not died out. Then the examination of tissue will be more fertile of results.

DR. HOWARD FOX, New York: I am sorry Dr. Cameron did not have time to say something about the differential diagnosis. I should like to know what diseases he considered clinically before the diagnosis was settled by the microscope.

DR. OWEN H. WANGENSTEEN, Minneapolis: Dr. Weidman referred to an important differentiation; viz., the exclusion of certain cases of bovine actinomycosis in the discussion of the treatment of actinomycosis. Lignières and Spitz of Argentina a number of years ago described a lesion in cattle due to an organism that they called the actinobacillus, which pathologically was difficult of being distinguished from the "lumpy jaw" of true bovine actinomycosis. Actinobacillosis of cattle, as Magnusson of Malmö has pointed out, is not actinomycosis at all. Whereas potassium iodide is an impotent remedy in "lumpy jaw," its administration alone will cure actinobacillosis in cattle or swine. Dr. Henrici of the department of bacteriology at the University of Minnesota informs me that actinobacillosis does not occur in man. [Since this paper was read, the report of a case in man has been published in THE JOURNAL, (July 23, p. 298).] In the treatment of human actinomycosis there are three therapeutic agents that have enjoyed wide usage; viz., surgery, potassium iodide, and x-rays and radium. When one subjects these three therapeutic agents to an "acid test," as one readily has an opportunity to do in dealing with abdominal or thoracic actinomycosis, one will find on perusing the literature that potassium iodide and x-rays or radium are futile remedies, and that in practically all of the few reported cures the patients were subjected to operation. Patients with actinomycosis not infrequently exhibit an unusual tendency to get well if one will promote surgical drainage. One need not extirpate the diseased tissue in the manner in which it is necessary to deal with cancer. Incision, curettage, excision of tissue and drainage are the mainstays of treatment. The report of Heyerdahl of Oslo with reference to the value of irradiation in the treatment of the cervicofacial group of actinomycosis establishes its worth beyond question. Irradiation and potassium iodide, however, should be looked on as adjuvant measures in the treatment of this granulomatous condition.

DR. OLIN J. CAMERON, Ann Arbor, Mich.: In answer to Dr. Fox's question: As to the conditions which were considered chiefly in differential diagnosis, they were not many: first, carcinoma; second, gumma; third, the other granuloma that one sometimes sees in this location; namely, tuberculosis; the other common condition which I think should be considered is infected cyst. In order to make a definite diagnosis of actinomycosis it is absolutely necessary to demonstrate the organism, in the fresh pus, in serial sections stained, or by culture. Dr. Wangensteen mentioned again the value of surgery and it certainly must be necessary to resort to surgery in the visceral type of the disease. I have wondered whether perhaps in the tongue lesions the iodides and roentgen therapy would not be sufficient, but I have been a little afraid to exclude surgery in the cases I have seen.

BACTERIOPHAGE AS A THERAPEUTIC AGENT IN STAPHYLOCOCCUS BACTEREMIA

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AND
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NEW YORK

Previous publications from our laboratory have mentioned the use of bacteriophage as an aid in the treatment of infections of the blood stream and we have indicated that in some instances the patients survived. So far we have not presented detailed information concerning any of these patients. It seems worth while to discuss some of these in considerable detail in order that the method of using bacteriophage may be more fully understood.

There are in the literature reports of bacteriophage treatment in small numbers of cases of blood stream infection. Little attention, however, has been given to the question of dosage and methods of administration. Obviously, a fairly large series of observations will be necessary before one can be very certain about the best technic.

For our present report there are available detailed hospital records on eight patients suffering from staphylococcus infection of the blood stream observed by us at the New York Post-Graduate Medical School and Hospital. We also have somewhat meager records of four other patients, seen by us outside the hospital. In addition, there are even less satisfactory reports on three patients treated by administration of our staphylococcus bacteriophage but not seen by us. This makes a total of fifteen patients with staphylococcus septicemia. Of these, seven survived and eight have died.

The bacteriophage employed represents a pooled mixture of a number of lytic agents active against staphylococcus, which mixture has been enhanced in its activity by serial filtration and transplantation in our own laboratory. In each case its potency against the particular staphylococcus has been demonstrated by laboratory test. Two preparations of this bacteriophage have been available. One is the filtrate of a lysed staphylococcus culture in nutrient broth. The other is the filtrate of a lysed staphylococcus culture in a nearly protein-free asparagin culture medium.

The asparagin medium is made by dissolving 3 Gm. of asparagin, 2 Gm. of magnesium sulphate, 4.5 Gm. of sodium chloride and 2 Gm. of dipotassium hydrogen phosphate in a liter of distilled water. This mixture is brought to a boil and then the hydrogen ion concentration is adjusted to 7.6 by adding sodium hydroxide. The medium is autoclaved at 15 pounds pressure for fifteen minutes; then it is filtered to remove a precipitate and is tubed. It is autoclaved a second time at 15 pounds for thirty minutes. The final p_H should be from 7.0 to 7.2.

From the Department of Pathology and Bacteriology, New York Post-Graduate Medical School and Hospital.
These studies have been supported in part by a grant from the Josiah Macy, Jr., Foundation.
Read before the joint meeting of the American Association of Pathologists and Bacteriologists and the American Association of Immunologists, Philadelphia, April 28, 1932.

The technic for preparing the bacteriophage is a bit more difficult in the asparagin than in broth. The bacteriophage must have been proved potent for the organism in broth before it is grown in asparagin. Then a freshly grown agar culture of the organism is suspended in the asparagin medium and a sufficient quantity of this suspension added to each of several tubes of asparagin medium to make a barely perceptible cloud. The potent broth bacteriophage is added, 0.5 cc. to each tube, and the tubes are incubated at 32 C. for eighteen hours. At this time one of the tubes with phage, which should be crystal clear, is filtered. This filtrate is used to inoculate a second generation of cultures in the asparagin medium. The filtrate of this second generation is then used to inoculate a large volume of third generation, which is finally filtered to yield the preparation employed in therapy.

The broth preparation has been employed for local application to open wounds and occasionally has been used for subcutaneous injections. The asparagin preparation has been used for most of the subcutaneous injections and for all the intravenous injections. We purpose to discuss our fifteen cases, beginning with the three patients not seen by us and considering next the four patients seen by us but treated outside our own hospital. We shall then proceed to a more detailed consideration of the eight patients subjected to experimental therapy under our more immediate control.

The first patient in the first group, Mrs. A., was a resident of a city about 300 miles from New York. Her illness began in May, 1931, with a furuncle on the face extending into the scalp. The lesion was incised. Subsequently a positive blood culture was obtained on two occasions. One of her physicians called at our laboratory and submitted a culture obtained from the blood stream. Bacteriophage was furnished for local treatment of this patient. She made a complete recovery.

The second patient in this series was a man, aged 32, with cellulitis of the foot and septicemia. The fever was recognized as septic in type, Oct. 8, 1931. The foot was incised the next day. Positive blood cultures were obtained, October 12 and 14. The asparagin bacteriophage was administered, November 2, two doses of 1 cc. each of the 1:10 dilution being given intravenously. November 3, 0.5 cc. of undiluted bacteriophage was given intravenously in the morning and again in the afternoon. Following this, the temperature fell from 104 to 99 F., but during the following days it gradually rose by steps up to 103, although the intravenous administration of bacteriophage was continued in doses of 0.5 cc. twice daily until November 7. November 8, the dose was increased to 1 cc., and this was followed by a chill. The dose was again reduced to 0.5 cc., twice daily, and a few drops were injected into the subcutaneous tissue of the foot. The administration of bacteriophage was then discontinued. Fever ranged from 100 to 103 until November 24, after which there was rapid convalescence and the patient was discharged, December 14, and has remained well.

A third patient in this series had a fulminating infection of the blood stream without a recognized portal of entry. He had been sick three days when bacteriophage was administered, one dose of 0.25 cc. of the 1:10 dilution and a second dose of 0.5 cc. of the same, following which death occurred. At autopsy there were multiple pyemic abscesses of the heart, liver, spleen, kidneys and intestine.

In the next group there are four patients:

In the first[1] of these, Mrs. D. L., aged 32, a physician's wife, a furuncle developed on the face, Oct. 14, 1931. This lesion extended slowly at first and then more rapidly. She was admitted to the hospital, October 22. The course of the temperature and pulse together with other outstanding features of the clinical record are shown in chart 1. A blood culture, October 22, was positive for Staphylococcus aureus. A blood culture, October 23, yielded about 27 colonies per cubic centimeter of blood. Subsequently blood cultures were positive on October 24, 25 and 29 and on November 2. At 11 p. m., October 23, an intravenous injection of 37 cc. of staphylococcus antitoxin (serum from an immunized horse) was given. About an hour later the pulse was very rapid and the temperature rose to 106.4 F.; numerous erythematous spots appeared over the abdomen. There was no chill, and the fever soon subsided somewhat.

At noon on October 25, under colonic ether anesthesia, a transverse incision was made 25 mm. above the right clavicle, and the right external and internal jugular veins were ligated. A second incision on the forehead, vertical, 25 mm. in length, was made in search of a possible thrombosed vein but none was found. A blood culture was taken and a transfusion of 400 cc. given.

October 26, we supplied bacteriophage for the treatment of this patient to her husband, who represented the situation as desperate. The bacteriophage was not used, however, and on urgent invitation of the husband we saw the patient at noon, October 27. Administration of bacteriophage was begun at once by intravenous injection at intervals of forty minutes,

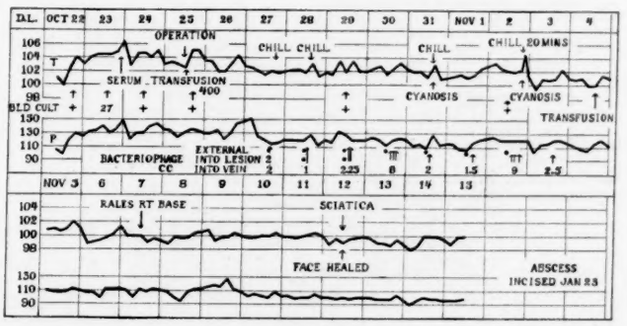

Chart 1.—Abridged clinical record of D. L., a white woman, aged 32, with an initial infection on the chin: The temperature was 101 on admission, Oct. 22, 1931, and rose to 106.4 after injection of antistaphylococcus serum, October 23. The jugular veins of the right side were ligated, October 25. Blood culture was positive, October 22, 23 (27 bacteria per cubic centimeter), 24, 25, 29 and November 2. Bacteriophage was administered by external application, by injection into the tissues of the face and by intravenous injection, from October 27 to November 3. The three injections amounting to a total of 9 cc. intravenously, November 2, appear to have exerted the most favorable effect. A late subcutaneous abscess appeared in December and was incised, Jan. 23, 1932. The patient has recovered without disfiguring scars on the face. The outcome has been most fortunate. Possibly the late abscess might have been avoided by continuing the bacteriophage a much longer time.

beginning with 5 cc. of a 1:10 dilution of the asparagin bacteriophage and continuing with increasing doses until a total of 2 cc. of undiluted material had been given over a period of about three hours. After the first intravenous injection, multiple subcutaneous injections, through a fine needle, were made into the tissues of the face all about the circumference of the swollen area, which extended from the middle of the forehead to the larynx and almost from ear to ear; approximately 2 cc. of undiluted asparagin bacteriophage was used here. Broth preparation of bacteriophage was applied as a wet dressing to open incisions and to several minute openings in the skin of the face. A slight chill occurred at 6 p. m., but without a significant rise in temperature. This procedure of treatment was repeated, October 28 and 29, with some variation in dosage. Following the positive blood culture of October 29, the intravenous dose was increased to 8 cc. in three injections (1.5, 2.5 and 4 cc. at intervals of seventy-five minutes), October 30, without a chill. October 31, however, a single intravenous injection of 2 cc. was followed in an hour by cyanosis and a definite chill. A single intravenous injection of 1.5 cc. was given, November 1. During this whole time local application to the wounds was continued. November 2, the most radical use of the bacteriophage was undertaken. Intravenous injection of 2 cc. at 3 p. m., 3 cc. at 4:30 and 4 cc. at 7:30 was followed by a severe chill at 8:30 which lasted twenty minutes, with cyanosis and a rise in temperature to 104.6. The next day the patient was much better in every way. An intravenous injection

1. We are indebted to Dr. John Munn Hanford of 60 East Seventy-Fifth Street, New York, for the detailed clinical record of this patient, who was under his immediate care.

of 2.5 cc. was given, and then the use of bacteriophage was discontinued. There was a suggestion of pneumonia, November 7, and persistent sciatic discomfort for a time about the middle of November. The face healed without conspicuous scars, and the patient left the hospital, November 15. She continued to have somewhat indefinite pains in the thighs and shoulders. A sluggish abscess was recognized in the subcutaneous tissue over the right sternoclavicular joint about December 15; this decreased in size. The patient was free from fever. However, this abscess was incised, Jan. 22, 1932, and yielded pus containing abundant staphylococci on culture. The incision healed promptly, and subsequent reports indicate complete recovery.

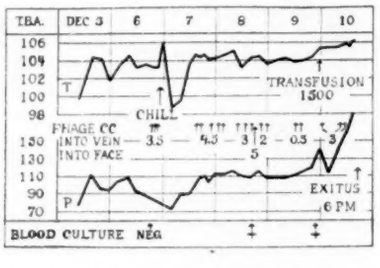

Chart 2.—Abridged clinical record of T. B. A., a white man, aged 24, with an initial furuncle on the upper lip: Intravenous injections of bacteriophage on the evening of Dec. 6, 1931, were followed by a sharp reaction and temporary clinical improvement; but the disease rapidly progressed to a fatal termination. Local injections into the face were given first on December 8. It seems unfortunate that local injections of this sort were not given two or three days earlier. A blood culture, December 6, just before the bacteriophage therapy was begun, was negative. A blood culture at 6 p. m., December 8, showed innumerable colonies from 1 cc. of blood, and one taken late on December 9 gave a similar result. The staphylococcus was fully susceptible to lysis by the bacteriophage in the test tube.

The second patient in this group was a dentist, aged about 45, who had suffered from mild diabetes for many years. He developed septic fever, which progressed rapidly. Apparently he had been ill for only three or four days when first seen by us, Nov. 9, 1931. At that time the temperature was between 103 and 105 and his pulse between 55 and 70. It was thought that he had an abscess in the ventricular septum of the heart. A blood culture taken at this time showed more than 50 bacteria per cubic centimeter. Intravenous injections of bacteriophage to a total amount of 3 cc. of the undiluted asparagin preparation were given on that day. During the night, hemiplegia developed. On the following day he received 9.5 cc. of the asparagin bacteriophage intravenously. November 11, he received 5 cc. more intravenously. He died at 11:45 a. m., November 11. Autopsy was not permitted. This patient was heavily narcotized and considered moribund when first seen.

The third patient in this series was a physician, aged 24, a member of the intern staff of a neighboring hospital. A furuncle developed on the lower surface of the nasal septum, Dec. 2, 1931. Following this, there was a septic temperature and the patient was admitted to the hospital, December 5. The abridged hospital record is shown in chart 2. He was first seen by us on the evening of December 6, when, after a preliminary blood culture, which remained negative, he received 3.5 cc. of asparagin bacteriophage intravenously in divided doses. Fifteen minutes after the last dose he had a severe chill and the temperature rose to 106. At this time injection of the swollen face was strongly urged by us but the attending surgeons refused to permit any local injections. Next morning he was clinically improved, and the temperature was 99.6. That afternoon, however, the swelling of the face again increased. Intravenous administration of bacteriophage, 2.5 cc., was given in three doses at 3:50, 5:40 and 10:30 p. m. and two more doses of 1 cc. each after midnight. The next day, December 8, five doses of 1 cc. each were given from noon to about 3:30 p. m. At 5 o'clock a blood culture was taken and, after this, 5 cc. of bacteriophage was injected into the subcutaneous tissue at the margins of the swelling on the face. Intravenous bacteriophage doses were continued throughout the next day, but at noon a preparation obtained from Dr. d'Herelle was substituted for the one previously used. Another blood culture was taken, December 9. This one, as well as the one taken on December 8, showed innumerable colonies of Staphylococcus aureus. A large transfusion was given at midnight, December 9. The patient died at 6 p. m., December 10. Autopsy was not permitted.

The fourth patient in this group was a woman, aged 23, seen by us, Sunday, January 17. She had been ill for three days with general sepsis, evidently subsequent to an induced abortion. A blood culture taken at this time showed 286 colonies per cubic centimeter. Intravenous injections of bacteriophage were given on Sunday afternoon in divided doses, the total amount being 5.5 cc. of the asparagin preparation. On Monday two doses of 10 cc. each were given intravenously, after which the treatment was discontinued. There was never any chill or rise of temperature suggesting a reaction to the bacteriophage. The patient died the following day. Necropsy revealed extensive purulent thrombosis of the pelvic veins and pelvic peritonitis, together with multiple purulent infarcts of the lungs.

Of the seven patients in these two groups, four died and three survived.

The first patient in our local series, a man, aged 36, was admitted to the hospital, Oct. 22, 1929, with an intermittent fever of three weeks' duration. He was discharged from the hospital, June 22, 1930, after a very complicated course of illness. During this period of eight months, several positive blood cultures had revealed Staphylococcus aureus. He suffered from septic pneumonia and later developed a large multilocular abscess of the left kidney which required nephrectomy. Following this, there was evidence of abscess in the other kidney. The patient received bacteriophage subcutaneously and by local application in large amounts to the nephrectomy wound and also by oral administration. The record of the bacteriophage treatment is somewhat incomplete, and the clinical record of the patient is, of course, exceedingly voluminous. He left the hospital convalescent and has returned to his work as a salesman. He considers himself quite well and has regained his normal weight. The bacteriophage treatment of this patient does not conform to the standards which we employ at present. However, the fact that the patient actually survived was highly encouraging.

The second patient in this series was a girl, aged 20 months, in whom multiple abscesses developed on the scalp about Jan. 31, 1930. The hospital record of this patient is shown in summary in chart 3. A blood culture was positive on admission, February 10, and again on February 12, 17 and 24, the day of her death. The number of bacteria in the blood stream was not large until the last day. On February 11, surgical incision of the scalp was performed, and on February 24 an abscess in the right pectoral region was opened by surgical incision. Bacteriophage was administered by subcutaneous injection and by local application to the scalp wounds from February

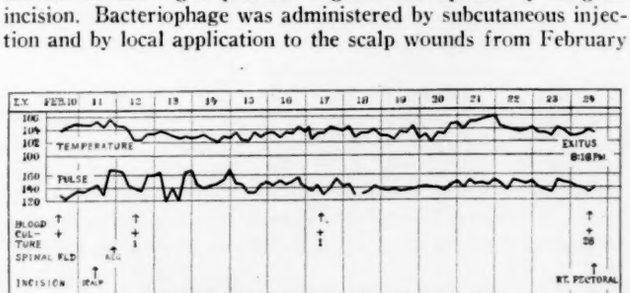

Chart 3.—Abridged clinical record of E. Y., a white girl, aged 20 months, with multiple furuncles on the scalp, and bacteremia and signs of pericarditis on admission, Feb. 10, 1930: Blood cultures were positive February 10, 12, 17 and 24. The bacteriophage was administered by subcutaneous injection, February 12, 13, 18, 19 and 20, and by application to the scalp wounds almost daily from February 13. No intravenous injections were given. At the time of death, February 24, the pericardial sac contained thick pus in which there were abundant living staphylococci.

12 to the time of death.—At the time of death a large amount of pus was aspirated from the pericardial sac, and this pus contained abundant staphylococci. The result in this instance was a total failure, although during the course of the illness there was evident clinical improvement for a time, and the scalp wounds did very well under the local bacteriophage treatment. At present we would administer the bacteriophage

intravenously in such a case and would recommend an early opening of the pericardial sac with application of abundant bacteriophage to the open pericardium.

The third patient in this series, a surgeon, aged 56, had had a stone removed from the right ureter, May 29, 1930. His clinical record is shown in chart 4. June 7, he was out of bed for a time. Following this his temperature rose, with two chills on June 9 and another on June 10 and two more on June 11, and a chill lasting for forty minutes on June 13. June 11, the wound was opened and a pus pocket drained. Positive blood cultures were obtained on June 11 and 13 and again on June 18. In this case the attending surgeon would permit only local administration of bacteriophage. This was poured into the wound in large quantities, June 12, 13, 18 and 19, a total amount of about 1,000 cc. of the broth filtrate being employed. The clinical improvement was very definite and with this improvement the use of the bacteriophage was discontinued. Negative blood cultures were obtained, June 23 and 28. The patient left the hospital, July 4, while still febrile, and subsequently a low-grade osteomyelitis of the thoracic vertebrae developed which disabled him for about a year. This finally healed with ankylosis. He returned to the active practice of surgery early in October, 1931, and has continued well. At present we would strongly urge intravenous injections of bacteriophage in such a case and would continue the treatment well into convalescence in the hope of escaping the catastrophe of a late metastatic localization.

The fourth patient in this series, a boy, aged 15 years, was sent home from school about Jan. 14, 1931, with a high fever.

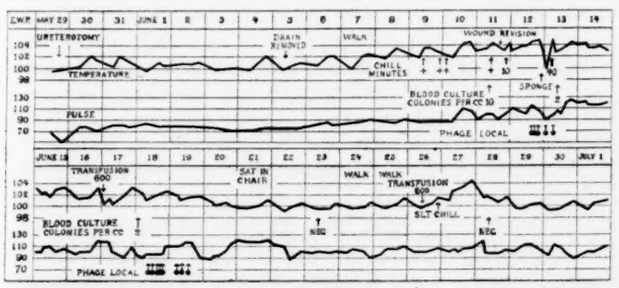

Chart 4.—Abridged clinical record of E. W. P., a white man, aged 56, who had a stone removed from the right ureter, May 29, 1930: Postoperative infection became evident, June 8, with positive blood culture, June 11, 13 and 18. Bacteriophage was poured into the surgical wound five times on June 12 and 13 and eight times on June 18 and 19, a total volume of about 1,000 cc. of the broth filtrate being used. No intravenous injections were given. Blood culture was negative, June 23 and 28. The patient left the hospital while still febrile and suffered a subsequent vertebral osteomyelitis, which disabled him for a year. Eventually he has recovered, with ankylosis of the vertebrae, and returned to duty as a surgeon late in 1931.

A diagnosis of pneumonia was made. He was admitted to the hospital, January 28, at which time there was continued septic fever and severe pains in the right hip and the left ankle. His abridged clinical record is shown in chart 5. A blood culture taken on this day was positive for staphylococcus. He appeared to be fatally stricken. Subsequent blood cultures, January 30 and 31, and February 2, 6, 7, 11, 16 and 17, were positive. Blood cultures, February 19 and 21, remained negative. Intravenous injections of the asparagin preparation of bacteriophage were begun, January 31, on which day a total of 40 cc. was given intravenously at a single injection, a procedure which we would not now recommend. This was followed by a chill lasting forty-seven minutes. Following this, large amounts of bacteriophage were administered in divided doses, the total amount given intravenously during the course of the illness being over 1,000 cc. For a time there was marked clinical improvement. From the beginning, however, there had been evidence of inflammation of the pericardium, and on February 19 there was evidence of cardiac dyspnea. The pericardium was entered with a needle on the evening of this day and apparently the pleura was wounded. This was discovered, February 21, when a second pericardial tap was performed. Both specimens of pericardial pus contained abundant viable staphylococci. In spite of the complicating pulmonary difficulty, the patient survived three days longer. The treatment was unsuccessful. However, the infection of the blood stream seems to have been overcome, and the case shows that massive intravenous doses of bacteriophage are not in themselves necessarily dangerous.

The fifth patient in this series, a man, J. O., was admitted to the hospital, March 6, 1931, with chronic prostatitis and chronic posterior urethritis. March 10, a suprapubic prostatectomy was performed. About sixteen days later the temperature rose rather abruptly and reached 105 on March 29 and 105.4 on March 30. A blood culture taken on this day was positive for paracolon bacillus. The temperature fell abruptly,

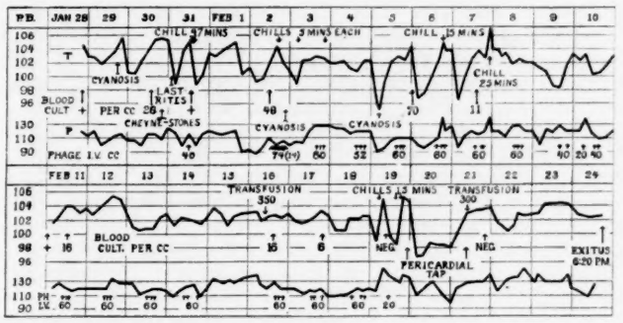

Chart 5.—Abridged clinical record of P. B., a white boy, aged 15, admitted, Jan. 28, 1931, with signs of pericarditis and beginning osteomyelitis: Blood cultures were positive on January 28, 30, 31, February 2, 6, 7, 11, 16 and 17 but negative on February 19 and 21. Large amounts of bacteriophage, altogether 1,006 cc., were given intravenously, beginning with a single injection of 40 cc. on January 31. The signs of osteomyelitis disappeared and the blood stream infection improved. The pericardial exudate contained living staphylococci, February 19 and February 21.

April 1, and remained below 102 until April 8, when it again rose and remained between 102 and 104. A blood culture, April 10, showed Staphylococcus aureus and failed to show a bacillus. Apparently the paracolon bacillus infection had disappeared. April 11, a single injection of staphylococcus bacteriophage of 4.5 cc. was given intravenously. The patient had a chill following this injection which lasted for forty minutes. After the chill had subsided, the temperature fell to 101. No further bacteriophage was given and the temperature slowly rose again to 105, on April 14, at the time of death. Autopsy was not permitted. In the light of our present knowledge we think that injections of bacteriophage should have been continued in this case.

The sixth patient in this series, N. R., a boy, aged 13 years, was admitted to the hospital, June 27, 1931, with a septic temperature and severe pain in the right shoulder and the right ankle. His abridged clinical record is shown in chart 6. A blood culture, June 27, showed 75 colonies of staphylococcus per cubic centimeter. A blood culture was also positive July

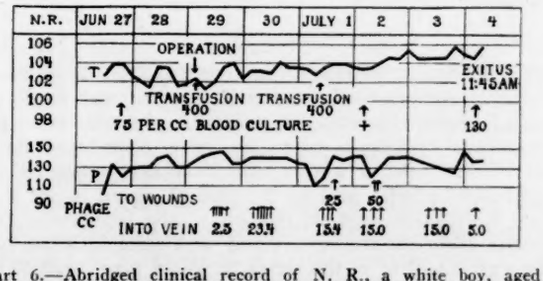

Chart 6.—Abridged clinical record of N. R., a white boy, aged 13, admitted, June 27, 1931, with symptoms of osteomyelitis and pneumonia: A blood culture, June 27, showed 75 colonies of staphylococcus per cubic centimeter of blood. The right humerus and the right tibia were opened early on June 29, and this operation was followed by a transfusion. Intravenous injection of bacteriophage was begun at noon and continued daily. The broth preparation of bacteriophage was poured into the surgical wounds, July 1 and 2. Blood culture, July 2, was positive; July 4, it showed 130 colonies per cubic centimeters of blood. Bacteriophage could not be recovered from these blood cultures. Death was due to pneumonia, which had required administration of oxygen for the last twenty-four hours.

2 and again July 4, when there were about 130 colonies per cubic centimeter. An emergency operation for osteomyelitis of the right shoulder and the right ankle was performed about 3 a. m., June 29, and following this a transfusion was given.

July 1, another transfusion was made. Intravenous injections of the asparagin preparation of bacteriophage were given by multiple doses on each day, beginning June 29, and bacteriophage was poured into the surgical wounds, July 1 and 2. The swelling of the unopened left ankle decreased but there was no chill nor recognizable general reaction. The patient died, July 4, with clinical evidence of massive pneumonia, open surgical wounds of the right shoulder and the right ankle and osteomyelitis of the left ankle, which had been recognized on June 29 but had not been opened. Postmortem examination was not permitted. In this case the bacteriophage therapy was a failure. The later blood cultures were examined for bacteriophage, but we were unable to recover it from them at any time. In the light of our present knowledge it would seem that much larger doses should have been given in this case, although the possibility of success may be seriously doubted.

The seventh patient in this series, A. T., a woman, aged 53, had suffered from osteomyelitis of both legs for many years. She was admitted to the hospital, Sept. 2, 1931, with a septic temperature and purulent arthritis of the right knee. Her abridged clinical record is shown in chart 7. The knee was opened widely, September 2. A blood culture, September 3, showed 50 staphylococci per cubic centimeter. September 5, the blood culture was again positive. September 8, it showed 60 per cubic centimeter, and on the 9th, 16 per cubic centimeter. The blood culture was negative, September 12 and 18 and again October 14. Bacteriophage was administered by local application to the open wound and by intravenous injection, September 5 and 6 and again September 10 and on the following days until October 1. Bacteriologic examination of the exudate

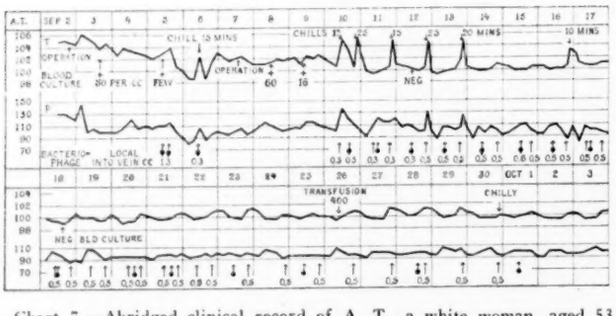

Chart 7.—Abridged clinical record of A. T., a white woman, aged 53, admitted, Sept. 2, 1931, with a suppurating right knee joint. The joint was widely incised, September 2, and a portion of the upper end of the right tibia was removed, September 7. A blood culture, September 3, showed 50 bacteria per cubic centimeter. Blood cultures were again positive on September 5, 8 and 9 but negative on September 12 and 18. Bacteriophage was poured into the opened joint, September 5 and 6, and was also administered by intravenous injection on these days. Because of positive blood cultures on September 8 and 9 the bacteriophage therapy was started again on September 10 and continued until October 1. During October the patient suffered a moderately active recurrence of a chronic cholecystitis, and cholecystectomy was performed. She was discharged from the hospital, December 21, in good condition. The chart record after October 3 is not shown.

from the knee, September 16, showed no growth of staphylococci. The patient gradually improved and on November 27 a cholecystectomy was done, and the patient was finally discharged from the hospital, December 21. In this instance the bacteriophage treatment seems to have contributed to the successful outcome in a case which at first appeared quite desperate. The latter part of the clinical record is not shown because it lacks interest in relation to the septicemia. Convalescence from the cholecystectomy was quite satisfactory.

The eighth patient in the series, J. W., a man, aged 32, was admitted to the hospital, Dec. 12, 1931, with a septic temperature which had developed after injection treatment for varicose veins of the left leg. His abridged clinical record is shown in chart 8. December 13 and 17, some of these veins were opened by surgical incision. Blood cultures were negative, December 14 and 18. The patient improved, and on December 26 he was allowed out of bed. However, on December 31 he had a sudden relapse with a rise of temperature to 105.4 and a blood culture taken at this time showed 6 colonies of staphylococcus per cubic centimeter. Bacteriophage treatment was begun on January 2, and intravenous injections were given on that day, as well as on January 3, January 5 and on subsequent days to January 27. The clinical course has been somewhat irregular. A blood culture, January 7, was negative. After a period of gradual improvement there was a sharp reaction, January 19. The patient had two severe chills, one at noon and the other at 10 p. m. The second one lasted for fifteen minutes and at the end of it the patient's temperature was 106. On the following day the temperature became normal.

Because of our fear that infection still remained latent in partly organized thrombi of the deeper veins, the patient was kept very quiet for several more days and the intravenous injections of bacteriophage were continued until February 1. Then this treatment was discontinued and a subcutaneous injection of 1 cc. was administered every other day from February 2 to February 13. The patient was allowed to be out of bed on February 3, 4 and 6 and daily thereafter, but only under careful supervision, to avoid fatigue. He was discharged from the hospital, February 14, and returned twice each week for a subcutaneous injection of bacteriophage, the last on March 18. Since leaving the hospital he has gained 25 pounds (11.3 Kg.). March 18, he was advised to go away from the city for a vacation of two weeks and then to go back to work.

COMMENT

The selection for intravenous injection of a bacteriophage preparation made in a nearly protein-free medium in which the nitrogenous pabulum is supplied by asparagin is based largely on theoretical considerations. These seem to us, however, to be valid. There is good reason to believe that some persons are peculiarly sensitive to substances present in the ordinary bacteriologic broth medium. Such observations as those made in the use of diphtheria toxin-antitoxin for immunization certainly suggest, if they do not prove, the existence of such sensitive human individuals. It is, of course, possible that some persons may be hypersensitive to such a simple amino-acid as asparagin, but this seems improbable, and such a sensitiveness might have been revealed to the patient by food intoxications at some previous time, particularly because this amino-acid is present in the common food asparagus. For a person hypersensitive to asparagus, we would prefer to try the broth preparation of bacteriophage or possibly a bacteriophage prepared in some other vegetable nutrient medium, such as the savita medium. Our limited experience has not as yet shown us any untoward effect which we could reasonably ascribe to the asparagin medium. When one considers the gravity of the disease with which one is confronted, there is an inclination not to pause very long in the consideration of possible toxic reactions of this sort; however, with more experience the dangers in this category may be more adequately appreciated, and possible measures to avoid them may be devised.

The mode of action of the staphylococcus bacteriophage within the body of the patient is not clearly understood. If one imagines that this agent will diffuse everywhere through the tissues and seek out and destroy the bacteria, increasing the while in abundance and potency, one will certainly be doomed to disappointment. The bacteriophage, whatever its essential nature, is placed at a disadvantage by conditions within the body in contrast to the more favorable conditions that may exist in the test tube. Pus, blood serum and probably also lymph and tissue juices, as well as various secretions on the surfaces and in the cavities of the body, exercise influences that may hinder the lytic action of this agent. It appears to be adsorbed by various colloids and to be eliminated from the body rather promptly. We have been able to recover bacteriophage from the urine after it was administered by mouth, but this cannot be easily done on every trial. In fact, we are strongly inclined to favor the application of the bacterio-

phage in the greatest possible concentration to the site of most active bacterial infection in the body, provided this site is readily accessible and can be reached without important damage to intervening structures. In bacteremia, the focus of origin, if it can be easily reached, should receive bacteriophage in large amount, at the same time that the agent is being introduced into the blood stream. Fortunately, open wounds may be drenched with bacteriophage in practically unlimited amounts without danger to the patient, usually with prompt local improvement. Administration by mouth, which we employed at first, has now been discarded as far as bacteremias are concerned.

Intravenous administration is the method on which we place chief stress. The technic should safeguard the integrity of the superficial veins, for in a successful case it may be necessary to puncture a vein several times each day for weeks or months, and these veins must not be sacrificed. Fine needles sterilized by boiling in petrolatum and glass syringes sterilized by steam

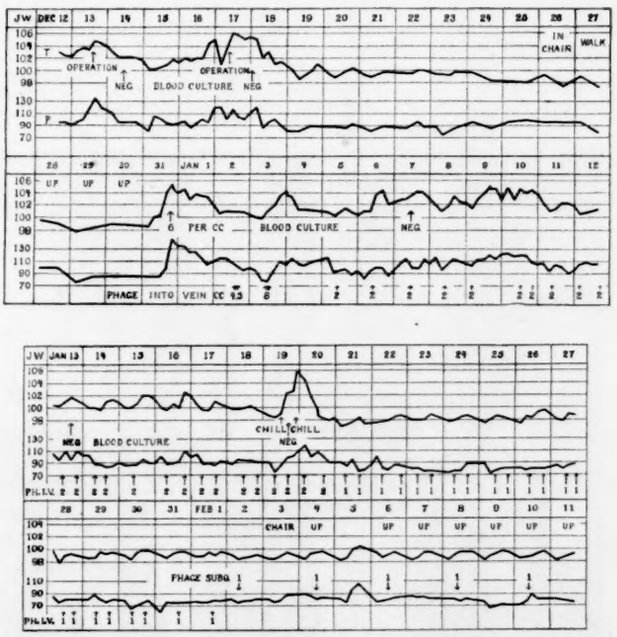

Chart 8.—Abridged clinical record of J. W., a white man, aged 32, admitted, Dec. 12, 1931, with septic thrombophlebitis of the left leg following injection treatment of varicose veins: Some of the veins were incised on December 13 and additional incisions were made on December 17. Blood cultures, December 14 and 18, remained negative. After being out of bed the patient had a relapse, December 31, and at this time a positive blood culture was obtained. Intravenous injections of bacteriophage were begun on Jan. 2, 1932, and continued to February 1. Further surgical intervention was considered from time to time, but because of the uncertainty in regard to location of the active process in the veins, no further operation was performed. Intravenous injections were replaced by subcutaneous injection, February 2 and the patient was allowed out of bed the next day. After discharge from the hospital, February 14, the patient returned twice each week for subcutaneous injections of bacteriophage until final discharge, March 18.

under pressure are recommended. After the injection, careful pressure over the puncture for at least five minutes will usually prevent any leakage. Proper technic will permit the use of the same vein at a distance of 1 cm. from the first puncture again within an hour. Multiple small doses at intervals of from thirty to ninety minutes are preferable, and each injection should be made slowly, from 1 to 2 cc. per minute. It is well to begin with 5 cc. of a 1 : 10 dilution and to increase the amount in subsequent doses, undiluted bacteriophage being used. In our opinion the injections should be continued with doubling of the dose until there is evidence of a shock to the patient, a chill or a distinct rise in temperature, or both. In some of the charts it is evident that the tide of battle has definitely turned in favor of recovery when such a shock has been produced. We are strongly of the opinion, however, that the injection of bacteriophage should be persistently continued long after such a shock and evidence of marked clinical improvement which may follow it, because there is no certainty that the bacteria have been eradicated, and latent foci may apparently be kept in a quiescent state and eventually exterminated by continuing the treatment. One may contrast the last two patients, A. T. and J. W., with two earlier patients, D. L. and E. W. P., in this respect.

The extermination of the bacteria is apparently only in part due to the bacteriophage. This agent probably brings about some change, possibly only slight, in the bacterial cells with which it comes in contact, so that they become more susceptible to the cells and fluids of the defending host. Such limited microscopic studies as we have made suggest that phagocytosis is much more active following administration of bacteriophage. Purulent collections, such for example as a pericardial exudate, are evidently not readily sterilized by intravenous administration of the lytic agent. In addition to its injurious effect on the microbes, the bacteriophage also evidently possesses some value as a vaccine, in part because of bacterial disintegration products present in the bacteriophage preparation itself and in part because of products of disintegration of the infecting bacteria in the body of the patient. We make no claim to an adequate understanding of these phenomena at the present time.

Fifteen clinical cases constitute only a small series in this era of statistical analysis of hundreds and thousands. We recognize this weakness in our report. Furthermore, it is recognized that patients are likely to recover, to die or to remain chronically ill, often with most disconcerting disregard of our therapeutic efforts. Our experience, however, previous to 1929 with patients giving two successive positive staphylococcus blood cultures, has been extremely uniform. All had died. There are reports of recoveries in the literature, but such recoveries may justly be said to have been sporadic. The series of fifteen cases here presented includes seven recoveries. We have therefore abandoned our previous hopeless outlook in staphylococcus bacteremia and now consider it an extremely grave but not necessarily hopeless condition. It seems also that even better results may be expected as further experience makes possible more intelligent and more skilful use of the agencies available.

SUMMARY

1. It has been possible to produce a staphylococcus bacteriophage which is highly potent against a large majority of bacteria of this species found in infections of the blood stream and to prepare this agent in a nearly protein-free medium.

2. Use of this bacteriophage by external application, by subcutaneous injection and, above all, by intravenous injection in a series of fifteen patients with staphylococcus bacteremia has been followed by death in eight and recovery in seven patients.

3. The treatment is not a simple procedure, and the course of the disease leading to recovery is quite prolonged. The brief clinical records pertain to the fatal cases.

4. Bacteriophage is a remedial agent which, when carefully and intelligently employed, may be expected to assist somewhat in the treatment of staphylococcus bacteremia, a disease that must still be regarded as extremely grave.

303 East Twentieth Street.

THE TREATMENT OF CONGENITAL CLUBFEET

A STUDY OF THE RESULTS IN TWO HUNDRED CASES

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DECATUR, GA.

The treatment of congenital clubfeet has presented an interesting but difficult problem since the history of early medicine. The lack of agreement among orthopedic surgeons as to the best method of treatment and the presence of many partially corrected or relapsed cases in every community today indicate that the present treatment is not as efficacious as might be desired, or that it has been improperly administered.

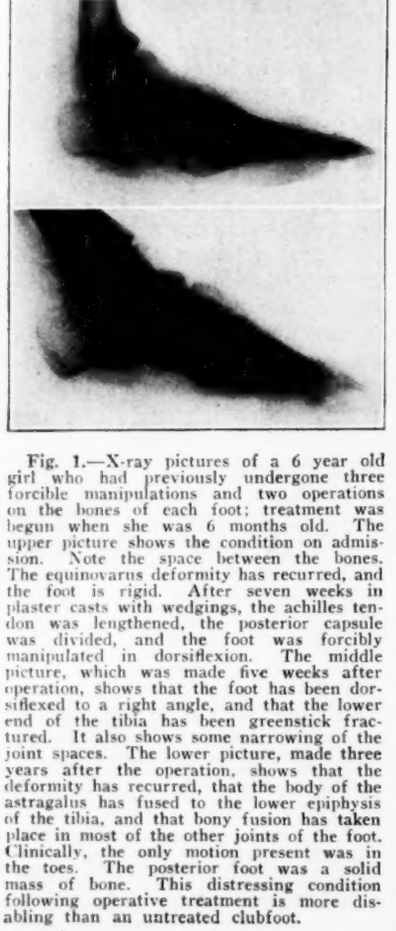

Fig. 1.—X-ray pictures of a 6 year old girl who had previously undergone three forcible manipulations and two operations on the bones of each foot; treatment was begun when she was 6 months old. The upper picture shows the condition on admission. Note the space between the bones. The equinovarus deformity has recurred, and the foot is rigid. After seven weeks in plaster casts with wedgings, the achilles tendon was lengthened, the posterior capsule was divided, and the foot was forcibly manipulated in dorsiflexion. The middle picture, which was made five weeks after operation, shows that the foot has been dorsiflexed to a right angle, and that the lower end of the tibia has been greenstick fractured. It also shows some narrowing of the joint spaces. The lower picture, made three years after the operation, shows that the deformity has recurred, that the body of the astragalus has fused to the lower epiphysis of the tibia, and that bony fusion has taken place in most of the other joints of the foot. Clinically, the only motion present was in the toes. The posterior foot was a solid mass of bone. This distressing condition following operative treatment is more disabling than an untreated clubfoot.

This study was made for two purposes: first to determine the efficiency of some methods, as judged by a study of the results, and, second, to determine some of the factors that influence treatment. Two hundred consecutive cases have been chosen for study. The personal equation has been eliminated in this series by the fact that every treatment in each case was given personally by me.

Hippocrates gave the first description of a clubfoot and taught that the condition was remediable, and that treatment should begin early. He recommended repeated manipulations and the application of a bandage to hold the foot subsequently. In 1803, Scarpa gave the first accurate description of the pathology of clubfoot. M. Guérin, in 1836, is said to have been the first surgeon to use plaster of paris in the treatment of clubfeet. The first operative treatment consisted of a subcutaneous tenotomy of the achilles tendon. This method was published in 1839 by Little, who had his own clubfoot corrected in this manner by Stromeyer, and who later popularized the method in Germany and England, where, however, a few tenotomies had been performed previously. Solly, in 1857, performed the first operation on the bone, when he removed the cuboid. In 1872, Lund did the first astragalectomy. Colley, in 1875, removed a bone wedge from the outer side of the foot, and three years later Bryant did the same. In 1883, Pughe resected the head of the astragalus. Phelps described his open operation for the reduction of clubfeet in 1884. M'Kenzie,[1] in 1904, listed fourteen different cutting operations, each sponsored by one or more men. He said, "Better results are obtainable by laying more stress upon manipulative methods and exerting a large amount of force in manipulation even in adults, than can be secured by the most extensive cutting operations." In the same year, Kennedy[2] pointed out the fact that while it was well to make the foot normal in appearance, the real object was to make it as useful as possible. Tubby[3] said that patients preferred a mobile but unsightly foot to a tarsectomized one of better appearance. Sir Robert Jones[4] said, "I have never seen a case of clubfoot where a good portion of bone has been removed where the foot has functioned well."

Fig. 2.—A 7 year old girl with bilateral clubfeet who had never been treated. The weight was borne on the lateral surface of each foot. None of the sole touched the ground, and the posterior foot was in marked equinus, so that the heels pointed upward. These feet were corrected without an anesthetic or any kind of operative treatment. They were corrected by a series of plaster casts and wedgings as described in the "nonoperative" method. It is now two years since the treatment was completed, and the feet have held their correction.

M'Kenzie,[1] Soule,[5] Fiske,[6] Elmslie[7] and many others showed much better results by forcible manipulations than by open operative treatment.

From the Scottish Rite Hospital for Crippled Children.
Read before the Section on Orthopedic Surgery at the Eighty-Third Annual Session of the American Medical Association, New Orleans, May 12, 1932.

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2. Kennedy, D.: Dublin J. M. Sc. **117**: 255, 1904.
3. Tubby, A. H.: Deformities: A Treatise on Orthopædic Surgery, New York, The Macmillan Company, 1912, vol. 1, p. 213.
4. Jones, Robert, quoted by Elmslie, R. C.: J. Orthop. Surg. **18**: 668 (Nov.) 1920.
5. Soule, Robert E.: Treatment of Congenital Talipes Equinovarus in Infancy and Early Childhood, J. Orthop. Surg. **7**: 667 (May) 1911.
6. Fiske, E. W.: The Prognosis of Congenital Clubfoot, and Its Relation to Non-Operative Treatment, J. A. M. A. **65**: 375 (July 31) 1915.
7. Elmslie, R. C.: The Principles of Treatment of Congenital Talipes Equinovarus, J. Orthop. Surg. **18**: 668 (Nov.) 1920.

This conservative idea has been carried a step further, and clubfeet have been corrected without the use of either an anesthetic or forcible manipulations. The correction has been accomplished gradually by a series of plaster casts and wedgings. The cases of one hundred patients treated by this method have been reported by me.[8]

In this study the cases have been divided into three groups, according to the type of treatment used. The first group of 31 patients comprises those treated by various operative procedures prior to the development of the "nonoperative treatment." During the past seven years, 169 patients with clubfoot have applied for treatment. One hundred and forty-nine, or 88 per cent, have been corrected by the nonoperative method. These make up the second group. The third group comprises 20 patients who had open operations on the bone.

The patients in the first group were treated by repeated forcible manipulations under an anesthetic, tenotomies and operations plantar fasciotomies, on the bone different from those described in the third group. These patients, as well as patients treated in a like manner by others, showed some good anatomic feet, but for the most part the feet were rigid and inelastic and were poor functionally (fig. 1).

In the nonoperative method, no anesthesia or force is used at any time. The feet are gradually corrected by a series of plaster casts and wedgings. As much correction as possible, without causing the patient pain, is obtained each time the cast is wedged or changed. In this way no damage is done to the foot, and no scar tissue is produced. All the short ligaments and structures on the medial side of the foot have a chance to stretch, and those on the lateral side of the foot to contract. The bones not only undergo an adjustment in relation to each other, but also undergo an adjustment in their individual anatomic contour. This adjustment cannot take place when the ligaments are cut and the deformity is corrected rapidly. When the treatment is completed, the feet are as flexible as they were at the beginning of the treatment; they are often more flexible because of the improved position. See the second figure and accompanying case report.

The third group is made up almost entirely of patients who came in with rigid feet with a recurrence, whose deformity was fixed by scar tissue, which followed some form of operative treatment elsewhere. Because of the ankylosis present, practically nothing could be accomplished by casts and wedgings. This method was tried in one test case for more than a year without success. After correcting as much of the deformity as possible by casts and wedgings in this group, the remaining deformity was corrected by a method similar to that devised by Dr. Hoke[9] for paralytic feet.

Attention is called to the possible embarrassment to circulation and the risk of gangrene when the equinus deformity is corrected too rapidly by operative procedures. The sudden changing of a foot from a rigid equinus position to a right angle by an operation on the bone may stretch the blood vessels to such an extent as to close the lumen of the vessels and thus produce gangrene in part or all of the foot. This accident occurred once in my series of cases. It was in the case of the patient whose foot is shown in figure 1.

Fig. 3.—A 13 year old girl with a rigid and severe clubfoot deformity on the left. She had seven forcible manipulations under ether anesthesia elsewhere, between the age of 2 and 6 months. The front part of the foot was adducted 90 degrees, and was inverted more than 90 degrees. A bursa had developed on the lateral side of the foot from weight bearing. The weight was borne on the lateral side of the foot and the dorsum of the fourth and fifth toes. None of the sole touched the ground. The heel was in equinus and inversion and pointed upward and backward instead of making contact with the ground. There was a deep longitudinal fold in the middle of the sole, which is always present when weight has been borne on the outer side of the foot. The upper row of pictures shows the condition before treatment and the lower row after treatment.

The ankle had been completely ankylosed for several years, so that the vessels were not accustomed to the constant stretching of a normal foot. The gangrene involved the lateral half of the foot. The foot was finally saved, but there was a loss of the lateral three toes and the distal phalanx of the second toe. This accident was avoided in the opposite foot by correcting only about half of the equinus after doing the complete operation on the bone, and, two weeks later, by bringing the foot up to a right angle. When the ankle joint is not fused, this accident can be avoided by wedging the foot in dorsiflexion, by lengthening the achilles tendon if necessary and, following this, by wedging the foot still further in dorsiflexion before doing the operation on the bone. This procedure should always be done before an open operation on the bone is performed,

8. Kite, J. H.: Non-Operative Treatment of Congenital Clubfeet: A Review of One Hundred Cases, South. M. J. **23**: 337 (April) 1930.

9. Hoke, Michael: An Operation for Stabilizing Paralytic Feet, J. Orthop. Surg. **19**: 494 (Oct.) 1921.

because it brings about an adjustment of the bones that cannot be obtained by operation alone. It also makes the operation easier and the results more certain.

M'Kenzie [1] mentioned sloughing of the foot after operative procedures. Stone [10] reported a case of gangrene in which two toes and the fifth metatarsal were lost following the correction of a rigid foot of a 2 year old boy by the use of a wrench. He referred to another case in which the foot was lost. Colonna [11] also reported a case following a cuneiform tarsectomy in which the fourth and fifth toes were lost. Inquiry reveals other unpublished cases, so that this hazard should be kept in mind when resorting to surgical procedures.

Fig. 4.—A closer view of the foot of the patient in figure 3, together with an anteroposterior x-ray picture and a tracing of the picture. This shows that the scaphoid is medial to the head of the astragalus, and that the cuboid is medial to the anterior end of the os calcis. When the weight thrust from the tibia is transmitted through the astragalus, it falls to the outer side of the forefoot and forces the foot further into adduction.

SUMMARY OF 200 PATIENTS OR 308 CONGENITAL CLUBFEET

One hundred and thirty-five patients, or 67.5 per cent, were boys, and 65, or 32.5 per cent, were girls. This ratio of 2 males to 1 female is that given in most statistics. Ninety-two, or 46 per cent, showed unilateral deformities, and 108, or 54 per cent, showed bilateral deformities. This is the reverse of most statistics, which give more cases as unilateral. Of the unilateral cases, 40 had a clubfoot on the right and 52 on the left. Some writers say that the two feet are involved alike, while others claim that the right foot is involved more frequently than the left.

Statistics vary as to the percentages of cases showing other congenital abnormalities, from 4 to 11. Twenty-four patients, or 12 per cent, showed other congenital deformities.

An hereditary history is said to be obtained in 4 or 5 per cent of the cases. My cases have shown a much higher percentage, as shown in my previous article. In 166 cases in which a definite inquiry was made into the family history, an hereditary history was obtained in 37, or 22.3 per cent. Nineteen of these were paternal and 18 maternal, so clubfoot deformity is transmitted equally through the male and the female. In the same series, a consanguineous history was obtained in 16, or 12.9 per cent. In 13 cases a brother had clubfeet, and in 3 cases, a sister.

RESULTS OF TREATMENT

Group I.—Thirty-one patients were treated by various operative procedures. All of these patients except 2 have returned for examination, the group averaging more than 3 return visits. There were many recurrences in this group. Some of these patients underwent 4 or 5 operative procedures during several series of treatments, so that some of them consumed more than two years of hospital time. They present fairly good anatomic feet, but because of the stiffness and lack of elasticity to the gait, rather poor functional feet. Five have been classified as excellent, 21 as satisfactory and 5 as poor.

Group II.—There are 149 cases in the "nonoperative group." Seventy-seven per cent of these patients have been followed from one to six years. Many of them have been examined every six months or a year since the completion of the treatment. Eighty-two patients, or 55 per cent, have been examined during the past year. Many others have reported by letter.

One of the chief objections to this method is the length of time required to complete the initial treatment. The average time required for the entire group was twenty-seven and two-tenths weeks. This includes the eight or ten weeks that the feet are held in plaster after the correction has been completed. The nonoperative treatment is recommended as a method that will give better feet, but not as a quick method. Yet, when the time required to correct the recurrences in this group is compared with that of the first group, it is found that there has been a saving in the total time of treatment by this method.

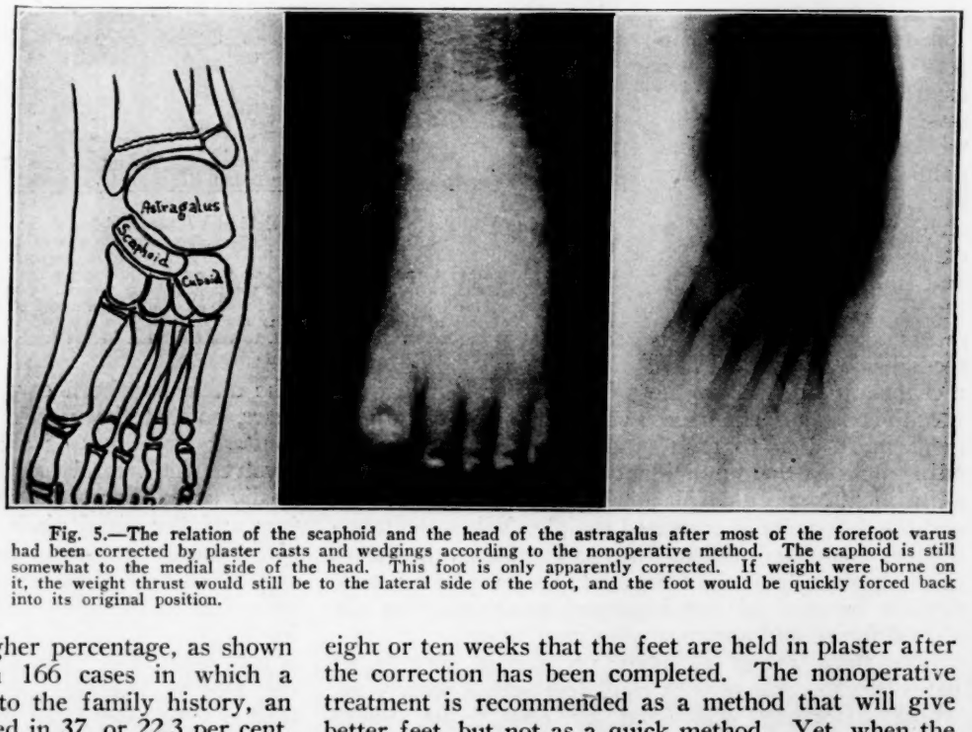

Fig. 5.—The relation of the scaphoid and the head of the astragalus after most of the forefoot varus had been corrected by plaster casts and wedgings according to the nonoperative method. The scaphoid is still somewhat to the medial side of the head. This foot is only apparently corrected. If weight were borne on it, the weight thrust would still be to the lateral side of the foot, and the foot would be quickly forced back into its original position.

10. Stone, C. A.: Treatment of Congenital Clubfoot, J. Orthop. Surg. **15**: 533 (July) 1917.
11. Colonna, Paul C.: The Treatment for Resistant Congenital Clubfoot, Virginia M. Monthly **51**: 144 (June) 1924.

Sixty-one per cent received their entire treatment in the outpatient department. While the time in casts was long, the cost to the hospital was small, as none of the patients had to be admitted, as would have been necessary if the quicker operative method had been used. The children who were admitted for part or all of their treatment lived too far from the hospital to be brought back and forth.

Fig. 6.—The foot after operation. The neck of the astragalus has been shortened and the head replaced medial to its original position, so that the scaphoid is now directly in front of the head of the astragalus. The weight thrust is transmitted straight forward in line with the toes. The cuboid is directly in front of the os calcis. The foot is balanced, and weight bearing will not cause a recurrence of the clubfoot deformity.

Seventy-five per cent of the patients in the nonoperative group required no further treatment. The recurrences in those requiring additional treatment were easy to correct, so that the total time spent under treatment was considerably less than that required to correct the recurrences in the first group. Every foot that showed any tendency to recur or that did not come well up in dorsiflexion was immediately put back in plaster. The object was to get good feet and not to have a low percentage of recurrences.

Thirty-four children were given a second course of treatment. Many of the feet were badly relapsed before the patients were brought back for treatment, as the treatment was started eleven and seven-tenths months on the average, after the first treatment. These cases required eleven weeks, on the average, to correct the deformity, and the feet were then held six weeks longer in casts. Seven required a third course of treatment, which was begun eleven and three-tenths months after the second course, and required thirteen and one-tenth weeks, on the average, for correction. Later, 2 of these patients had a short fourth course of treatment. The condition of the feet of these patients was recognized in the beginning as belonging to a class which is always difficult to correct.

An analysis was made of the recurrences to determine, if possible, the cause. No cause could be found to explain most of the recurrences, except that the photographs and the roentgenograms on admission showed an unusually severe type of deformity. The feet were shorter, more rigid and smaller than the average clubfoot for the age, and there was little muscle power. The influence of previous treatment elsewhere was also investigated. Of the 35 patients receiving incomplete treatment elsewhere, 14.3 per cent showed recurrences, which was below the average. It was found that 50 per cent of the children with other congenital deformities had recurrences, while only 18.6 per cent of the children who were otherwise normal had recurrences. Therefore, the presence of other congenital deformities increases the chance of a recurrence.

This group affords an excellent opportunity to study the various factors that might have an influence on accelerating or retarding the treatment of clubfeet in general, as the same method of treatment was used in every case, and the treatments were carried out by the same person in every case.

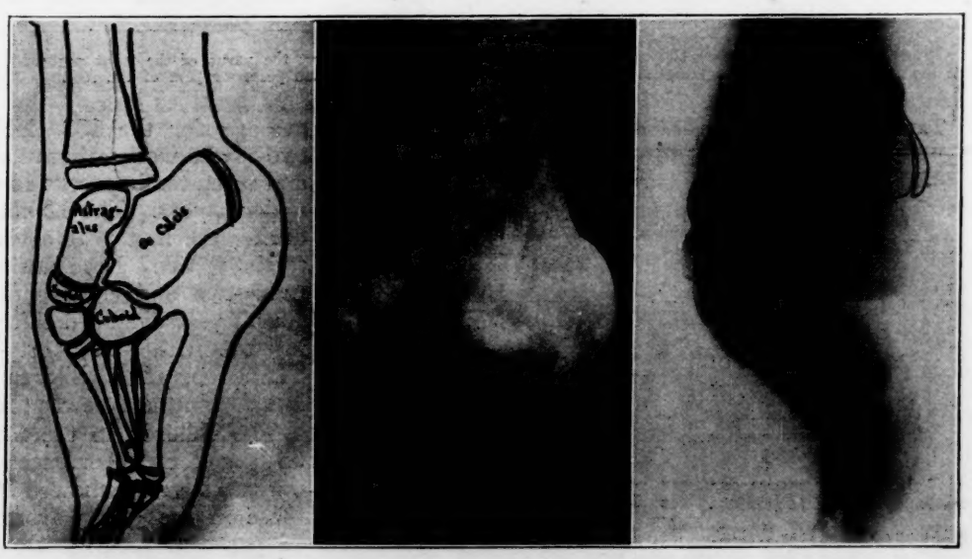

Fig. 7.—A lateral view of the foot, with an accompanying x-ray picture and tracing. The amount of equinus is readily seen in the x-ray picture. If the midline of the tibia were projected, it would fall in front of the foot, and the foot would be back of it, instead of at a right angle to it. The posterior end of the os calcis is drawn up, forcing the anterior end down in the equinus, just the reverse of its normal position. Only the posterior portion of the body of the astragalus is in contact with the articular surface of the tibia. The posterior portion of the superior surface of the os calcis is in contact with the posterior border of the tibia.

A study was made to determine the influence of age on treatment. As the children treated in the outpatient department received treatment only once a week or

once in two weeks, they were placed in one large group, while those receiving part or all of their treatment in the hospital were placed in another group, as they received treatment twice a week. The children in each group were divided into smaller groups according to the age at which treatment was begun. Tables 1 and 2 give the number of children in each age group and the average number of weeks required to complete the initial treatment for each group. The number of recurrences in each group is shown, and the average number of weeks required for the group for both the initial treatment and all recurrences is given. In drawing conclusions allowances should be made for some of the groups, which are small. Five children whose treatment was completed in eight weeks or less were omitted from the tables, as it was thought that these cases were so mild that they would, to a certain extent, vitiate the figures.

TABLE 2.—*Children Treated in Hospital* *

Age of Patient	Number of Patients	Average Number of Weeks Required to Complete the First Treatment	Number of Recurrences	Average Number of Weeks Required to Complete Treatment†
10 to 11 months	2	18.0	1	22.5
11 to 12 months	1	15.0	0	....
1 to 2 years	18	22.4	3	27.5
2 to 3 years	8	24.5	2	30.4
3 to 4 years	5	46.2	1	52.4
4 to 5 years	3	32.3	1	39.7
5 to 6 years	4	29.2	0	....
6 to 7 years	4	41.7	0	....
7 to 8 years	2	40.5	0	....
8 to 9 years	4	38.0	0	....
9 to 10 years	1	30.0	0	....
Summary for entire group	52	29.3	8	33.2

* This group comprises the children who received part or all of their treatment in the hospital, and who received treatment twice a week. The age group arrangement is the same as in table 1.

† Including the initial treatment and all recurrences.

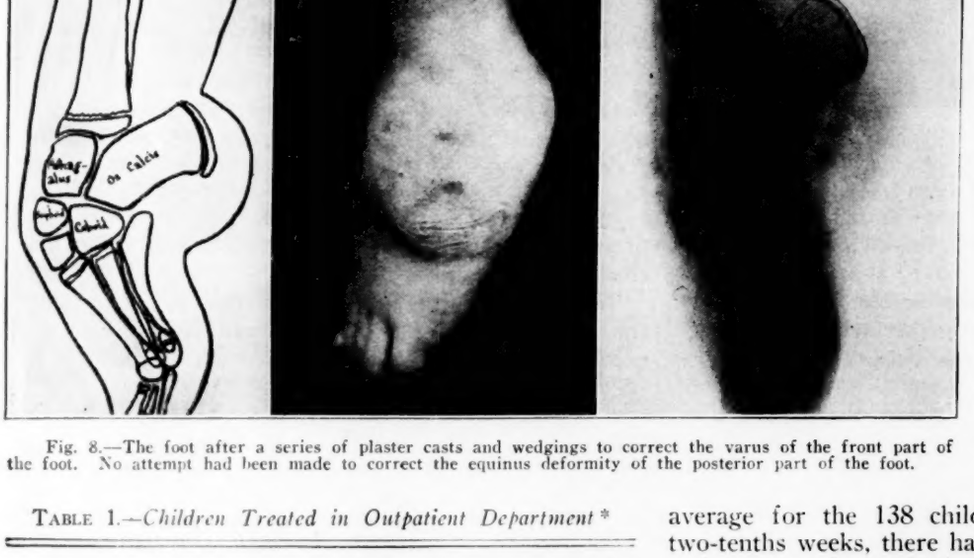

Fig. 8.—The foot after a series of plaster casts and wedgings to correct the varus of the front part of the foot. No attempt had been made to correct the equinus deformity of the posterior part of the foot.

TABLE 1.—*Children Treated in Outpatient Department* *

Age of Patient	Number of Patients	Average Number of Weeks Required to Complete the First Treatment	Number of Recurrences	Average Number of Weeks Required to Complete Treatment†
1 to 2 months	7	18.8	3	24.4
2 to 3 months	11	25.9	5	34.0
3 to 4 months	8	21.2	3	28.4
4 to 5 months	4	17.0	1	22.2
5 to 6 months	2	16.5	0	....
Summary of first 6 months	32	21.2	12	27.9
6 to 7 months	9	21.9	4	29.4
7 to 8 months	1	36.0	0	....
8 to 9 months	3	65.0	1	70.7
9 to 10 months	1	28.0	0	....
10 to 11 months	4	33.2	2	51.7
Summary of second 6 months	18	32.2	7	41.6
Summary of first year	50	25.5	19	32.8
1 to 2 years	12	27.2	1	29.8
2 to 3 years	9	32.8	1	34.8
3 to 4 years	1	29.0	0	....
4 to 5 years	4	38.0	1	42.2
5 to 6 years	2	41.5	0	....
6 to 7 years	2	24.0	1	32.0
7 to 8 years	1	36.0	0	....
Summary from 1 to 7 years	31	31.3	4	33.7
Summary for entire group	81	27.7	23	33.1

* This group comprises the children who were treated in the outpatient department, and who received treatment once a week or once every two weeks. It shows the number of children in each age group, the average number of weeks required to complete the initial treatment, the number of recurrences for each age group and the total time required on the average for both the initial treatment and all recurrences.

† Including the initial treatment and all recurrences.

Practically all children under a year were treated in the outpatient department. A study of this group (table 1) shows that the average time to complete treatment for 32 children who started treatment during the first six months was twenty-one and two-tenths weeks, while the average for 18 children who started treatment during the second six months was thirty-two and two-tenths weeks. The average time required for the 50 children under 1 year of age was twenty-five and five-tenths weeks. Keeping in mind that the average for the 138 children was twenty-seven and two-tenths weeks, there has been a saving of only one and seven-tenths weeks for those who started treatment under a year. The 12 children who started treatment during the first year averaged twenty-seven and two-tenths weeks. Nine during the second year averaged thirty-two and eight-tenths weeks. Four during the fourth year averaged thirty-eight weeks, and two during the fifth year, forty-one and five-tenths weeks. Therefore, after children begin walking there is an increase in the time required to complete the treatment.

The children in the first 6 months' group showed 38 per cent recurrences, and those in the second 6 months' group showed 39 per cent recurrences, while those in the group from 1 to 7 years showed only 13 per cent recurrences. The average time required for both the initial treatment and the recurrences for children who began treatment under 1 year was thirty-two and eight-tenths weeks, and for those from 1 to 7 years was thirty-three and seven-tenths weeks. Therefore, there was a saving of only nine-tenths week by beginning treatment during the first year.

In 1904, M'Kenzie [1] made this statement:

The difficulties encountered in obtaining an ideal foot are not increased in proportion to the age of the patient; the obstacles to be overcome in securing such an ideal result depend more upon the form and condition of the foot. The difficulties are increased in proportion as the foot is shorter and stouter; and

because of this fact efforts made for correction meet with more encouragement after the child has passed its first or even its second year.

This observation and teaching has been severely criticized in subsequent papers, but the facts revealed by this study seem to confirm his observation. Since this idea is opposed to the usual accepted teachings, it is still recommended that treatment be started early, till more groups of children can be carefully studied. Early treatment has the additional advantage of giving somewhat better feet.

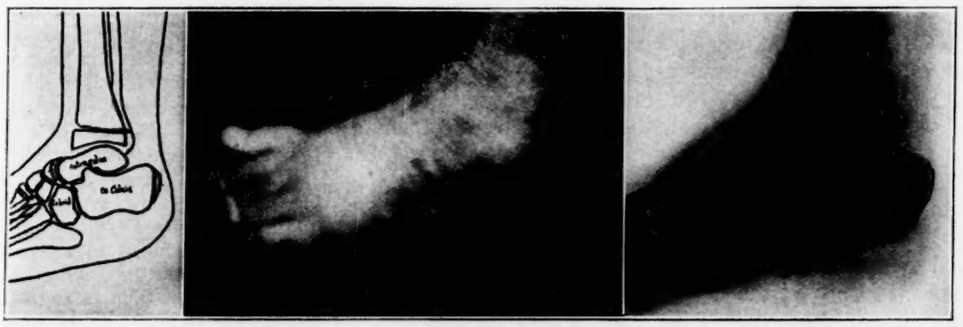

Fig. 9.—The foot after lengthening of the achilles tendon and the application of wedgings in dorsiflexion. The foot could be dorsiflexed to within 10 degrees of a right angle. The body of the astragalus has been driven back under the tibia in the mortise between the malleoli until the astragalus has been restored to its original position. The os calcis has been changed from an extreme equinus position to almost a normal position, and the superior surface has been separated from the tibia. This foot is not completely corrected, and would relapse if released. However, the foot is in a favorable position for operation.

A study of the influence of age on the group treated in the hospital (table 2) reveals the same facts as the clinic group. Each year after the children had begun to walk it required a little longer to correct the deformity. The children treated during the first year required twenty-two and four-tenths weeks, the second year twenty-four and five-tenths weeks, the fourth year thirty-two and three-tenths weeks, and the sixth year forty-one and seven-tenths weeks.

In order to determine the value of more frequent treatments, the children in the age groups from 1 to 5 were compared in each group. Twenty-eight patients who received treatments once a week or once every two weeks required thirty-one and six-tenths weeks to complete the first treatment, while 38 patients receiving treatment twice a week required only twenty-seven and four-tenths weeks. Therefore, a saving of four and two-tenths weeks was effected by the more frequent treatment.

Another study was made to determine the influence of sex. Ninety-four boys required, on the average, twenty-eight weeks of treatment, while forty-four girls required twenty-six and six-tenths weeks. Congenital clubfoot occurs twice as frequently in males as it does in females, and it also takes a little longer to correct the deformity in males.

Thirty-five patients, or 23.5 per cent, had had previous treatment. A few had had adhesive strapping; others had had forcible manipulations, 1 patient having had 27 forcible manipulations under ether. Many of these patients had undergone tenotomies, and a few operations on the bone. One had had 4 operations on the bone previously. Most of them had worn casts for from six to twelve months, and several had been in casts practically all their lives. Several had worn braces for long periods. All of the patients in this group still had severe clubfoot deformities. Many of the feet were more rigid than untreated feet and required longer than the average for correction. In a few cases the previous treatment had been of assistance, so that the time required for this group was twenty-six and five-tenths weeks.

It was found that fifteen patients had other congenital deformities. These patients required thirty-one and three-tenths weeks to complete the initial treatment. Fifty per cent of these patients had a recurrence of their clubfoot deformity and needed a second course of treatment, while 2 required a third and 1 a fourth course of treatment. The total time required for a permanent correction for the group was forty and five-tenths weeks. Therefore, patients with other congenital deformities, not including cases of "arthrogryposis multiplex congenita," require more than thirteen weeks' longer treatment.

Results of Treatment: One 10 year old boy with congenital clubfeet had superimposed on this condition a progressive muscular dystrophy, and was not treated. One patient died of scarlet fever while under treatment in the outpatient department. Treatment was discontinued in 4 children before the feet were fully corrected, as the parents were satisfied with what had been accomplished and would not bring them back to complete the treatment. In 15 patients the treatment has been so recent that they have been omitted in the study of the final results. Seven have died since the completion of treatment, but had excellent feet when last examined. Of the remaining 121 patients, 11 have "satisfactory" feet. These feet are not quite as good as might be desired, but are not bad enough to need further treatment. Some of these patients have rigid feet as the result of previous operative treatment. Others have other congenital deformities. Two patients might be helped by turning the tibia to correct the inward torsion. One patient who was treated when an infant has some mental deficiency and cannot walk or

Fig. 10.—The appearance of the foot six weeks after operation. All of the deformity has been corrected, and the foot has been restored to normal appearance. There is good ankle motion. The fusion of the other joints in a good position offers little handicap and assures a permanent maintenance of the correction. The lower row of pictures in figure 3 shows the foot after correction. The foot points straight forward, the heel is straight under the tibia, the sole is flat on the ground, and, in addition to being normal in outline, the foot has good motion in dorsal and plantar flexion and has maintained its correction.

talk at the age of 5 years, but has satisfactory feet. The remaining 110 patients have excellent feet. They are not only normal in appearance, but are flexible and have held their correction over a long period. These children are going barefooted or are wearing ordinary shoes and are free from all kinds of foot trouble.

Group III.—Twenty patients, or 28 feet, have had operations on the bone as mentioned. Seventeen of these patients had been treated previously; 4 with casts, 9 with forcible manipulations and lengthening of the achilles tendon and 4 with operations on the bone. Only 3 had received no previous treatment. These 3 were over 10 years of age and for this reason underwent operative treatment. The age of this group averaged 7 years when the patients were first seen. Ninety per cent of the group have been followed for from one to five years. Fifty per cent have been examined within the last year. There has been no recurrence in this group. The children all have good anatomic feet and are pleased with the result. They can wear ordinary "store" shoes. Many of these children have no elasticity to the gait, and some have rigid feet, so that they walk somewhat as if they were walking on stilts. The somewhat unfavorable results in this group are due to the fact that 17 of the 20 were admitted with rigid feet following early operative treatment.

SUMMARY

A study has been made of the results following several methods of treatment in 200 consecutive cases of congenital clubfeet, in order to determine the efficiency of the different methods of treatment and also to determine some of the factors that influence treatment.

From a detailed study of 149 patients in the nonoperative group, the following conclusions are drawn:

1. The duration of treatments has been shortened very little by beginning treatment at an early age. Counting the time to complete the initial treatment and all recurrences, the 50 children who started treatment under 1 year averaged only nine tenths of a week less than did the 31 who started treatment between 1 and 7 years. However, early treatment is strongly recommended because it seems to give better feet.

2. After the child begins to walk the duration of treatment becomes progressively longer.

3. The group treated twice a week showed a saving of four and two-tenths weeks over the group treated once a week.

4. It requires one and four-tenths weeks longer, on the average, to correct the deformity in boys than it does in girls.

5. Children who have been previously treated require, on the average, as long for the correction of their deformities as those who have never been treated.

6. Fifty per cent of the children with other congenital deformities had recurrences, while only 18 per cent of the otherwise normal children showed recurrences.

7. Children with other congenital deformities require, on the average, thirteen weeks longer for the correction of the clubfoot deformity.

Eighty-eight per cent of all clubfooted children who have applied for treatment during the last seven years have been successfully corrected by the nonoperative method. These patients have been corrected by casts and wedgings without the use of an anesthetic or force. There have been fewer recurrences in this group than in the operative group, and the recurrences have been easier to correct. The operative groups showed fairly good anatomic feet, but, because of the stiffness and loss of elasticity in the feet, rather poor functional feet. The nonoperative group showed still better anatomic correction with almost no functional disability.

ABSTRACT OF DISCUSSION

DR. E. S. HATCH, New Orleans: Only a few physicians get control of such a large number of patients over so long a period. Most of us do not have the complete control of our patients that Dr. Kite has. We are unable to keep our patients in hospitals or near us long enough to do as much massage and changing of casts as he does. I like to get these cases extremely early, a few days after birth, or a week or ten days or two weeks at the latest, and then by daily manipulation and nothing else I can get extremely good results. I was much interested to hear Dr. Kite say that he did not see much shortening of the treatment whether he started early or late. It has been my feeling that much better results are obtained in a much shorter period of time, or in a shorter time, the earlier the treatment is begun. I have never used his particular method, but I hold the foot after manipulation sometimes under ether and sometimes without ether, and I find that holding the foot over while the cast is being put on is an important part of the treatment. The author does the same thing after putting the cast on. When changing the shape of the foot I hold the foot and then put the cast on. The end-result, of course, is the same. I feel exactly as he does about not doing any operative procedure early. I hold the foot in a correct position as long as I can before doing anything in the way of operation. I feel that all orthopedic surgeons are working toward the same end in getting the most flexible type of foot that can be obtained, and surely less operative work is being done all the time, whether it is done under the author's method, which is an extremely good one, or by the other method of holding the foot and changing the casts from time to time. I frequently do not see the patients more than once a month; I cannot get them back in less than a month. By this method, if congenital clubfoot patients are seen early enough, either by daily manipulation or, if they are seen later, by overcorrecting the foot and holding this position while the plaster is being put on and keeping these plasters on for about a month at a time, I find that very good results are obtained. Long before the patients are ready to walk, in the average case they have a good overcorrected flexible foot.

A Bewildering Confusion.—Into many of the etiological questions of modern bacteriology there have been introduced problems of far-reaching biological consequences, which must be approached with the grim logic of the bacteriological forefathers unless we are to flounder in a bewildering confusion. These are the matters of the filtrable stages of true bacteria and the suggested cyclic relationship between bacteria and the ultramicroscopic viruses. These two questions have often been confused with each other and there is a growing school of investigators from whose work it is often unclear whether they advocate one of these theories only or whether, in claiming the truth of one, they mean to imply that of the other as well. In regard to these developments, bacteriology is in much the same confusion with which it was threatened in the early etiological era, when countless false leads were laboriously followed out by investigators who attached etiological conclusions to the mere isolation of any organism from an animal or man suffering from a specific disease. And the formulation of his postulates by Koch was the warning of an uncompromising disciple of the truth against the dangers of allowing faulty reasoning to leap across experimental chasms. It is time for us to set up, in consultation, similar postulates in regard to the problems alluded to, if we are to avoid the obstructions to permanent progress which loose reasoning always produces. For there is no room for two schools of theory in any of these matters. Either a proposition is demonstrable by experiment, and confirmable, or it is not.—Zinsser, Hans: On Postulates of Proof in Problems of the Bacterial Life Cycle, *Science* **75**:256 (March 4) 1932.

PNEUMONIA DUE TO THE ASPIRATION OF LIPOIDS

JOHN W. PIERSON, M.D.

BALTIMORE

The extensive use of oils in pediatric practice, both as food and for therapeutic purposes, has been attended in some instances with unexpected pulmonary complications; unexpected, because it was not realized until pointed out by a number of observers, that oils, when given to young children either orally or through the nasopharynx, not infrequently pass into the trachea and ultimately reach the alveoli of the lungs. Having reached the alveoli, the fats and oils initiate an interesting pathologic process. The earliest literature pertaining to these pathologic changes refers to experiments done on animals. In 1920, Guieysse-Pellissier [1] described the changes in the lungs of rabbits and dogs following the intratracheal injection of olive oil. He found that the alveoli of the lungs were filled with many large mononuclear cells containing oil, polymorphonuclears and eosinophils. Corper and Fried,[2] in 1922, described similar changes resulting from the use of olive oil, liquid petrolatum and chaulmoogra oil administered in a like manner. They stated that the changes produced in the lungs by the chaulmoogra oil were dependent on its chemical composition, and that when the olive oil and the liquid petrolatum reached the alveoli they remained in situ for a long time and produced a mild proliferative type of bronchopneumonia.

Laughlen,[3] in 1925, reported four cases in which he found large quantities of oil in the lungs. Three of his cases were in very young children, and one in an adult with paralysis of the larynx and vocal cords. He found changes in the lungs in his cases similar to those produced experimentally by Guieysse-Pellissier, and, furthermore, he was able experimentally to reproduce the same pulmonary conditions in animals. His conclusions were as follows:

> That oil finds its way into the alveoli of the lungs, not only when directly introduced into the trachea, but also at times when administered in sufficient quantities in the nose and throat.
>
> Oil when present in the lung is actively phagocyted by endothelial cells which are present in sufficient numbers to dispose of all the oil present and produce consolidation of the lung.
>
> Argyrol, when given by mouth or introduced into the trachea, does not lead to any reaction on the part of the endothelial phagocytes in the lungs.

Pinkerton,[4] in 1927, reviewed the literature and reported six cases. The material which he found in the lungs was as follows: mineral oil alone in two cases, milk fat in one case, egg yolk in one case, mineral oil and cod liver oil in one case and cod liver oil alone in one case. He described the processes by which he identified these various materials; he discussed all the possible sources of fatty material in the lungs, and was convinced that in his cases their material had reached the lungs by way of the trachea. His conclusions were essentially the same as those of Laughlen, with the added observations that the removal of the fatty material from the lungs is a slow process; that the end-result is the production of fibrosis and giant cell formation, and that an acute pneumonic process is usually superimposed on the primary picture, thereby causing death in most cases.

This communication was prompted by an experience with a case in which the roentgen signs indicated much more pulmonary involvement than the clinical manifestations.

The child was being treated principally because he did not thrive and had repeated colds, for which he had been given oil drops for a period of weeks. The physical signs revealed areas of impaired resonance posteriorly in each lung, and some coarse râles were heard. The results of the roentgen examination made at the same time showed extensive fibrosis and large areas of consolidation in each lung, with the impression that there was an underlying tuberculous infection. The child showed none of the usual signs of pneumonia, and repeated tuberculin tests were negative. This apparent discrepancy between the clinical and roentgen findings regarding the extent of the pulmonary involvement continued throughout the course of the disease, and was finally explained by the pathologic report. The general condition of the patient improved during a period of ten months, but the pulmonary condition remained practically stationary. Repeated roentgen examinations continued to exhibit much more extensive pulmonary involvement than was evidenced clinically, and showed a gradual shifting of the areas of consolidation. Two weeks before his death, the child developed otitis media, mastoiditis and finally streptococcus meningitis. No change took place in his pulmonary condition during his final illness. The pathologic report was as follows:

"Gross Specimen: The heart looks normal. The right lung shows no extensive consolidation; there is some consolidation about the hilum of the right lung. On passing to the left lung, there is found to be very extensive consolidation occupying all the more central part of the lung, leaving some parts uninvaded at the apex and base and outer surface. There is a very peculiar consolidation with a good deal of scar tissue extending out from and around the bronchi and blood vessels, ending rather sharply against normal looking tissue; but more striking than the scarring is the mottling with yellow tissue, which lies everywhere between the gray tissues. There are even tubercle-like nodules 2 or 3 mm. in diameter. All this tissue is found to contain a fatty material which gives the reaction of petroleum oil."

The interest in lipoid pneumonia aroused by the first case led to a clinical diagnosis of the probable presence of this disease in a number of others, which diagnosis was later confirmed pathologically in a second case. Since the original report of these two cases six months ago, two other proved cases have been observed, which would indicate that though the incidence of lipoid pneumonia is rare, it occurs with sufficient frequency to warrant consideration in all cases of chronic low grade pneumonia in children.

PATHOLOGY

A study of the pathologic changes in the lungs leads to a better understanding of the roentgenologic findings. As soon as the oils reach the alveoli of the lungs, there occurs a prompt reaction characterized by a tremendous outpouring of the large mononuclear cells. The rapidity of this reaction may be judged by an observation of Boyd,[5] who states that "within 5 minutes of spraying oil into the trachea, the alveoli become filled with

From the Department of Roentgenology, the Johns Hopkins Medical School.

Read before the Section on Radiology at the Eighty-Third Annual Session of the American Medical Association, New Orleans, May 12, 1932.

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phagocytic cells." The origin of these large cells has been the subject of much discussion; they have been attributed to the alveolar epithelium, the vascular endothelium and the histiocytes. They evidently correspond to the dust cells of pneumonoconiosis and the epithelioid cells of tuberculosis. While the origin of the large mononuclear cells remains obscure, there is no doubt regarding their destiny. They attack the fatty material at once and incorporate as much of it within themselves as possible; then, passing through the walls of the alveoli, they finally reach the lymphatics. The lymphatics become engorged with these mononuclear cells, some of which break down allowing the oil to become free to collect in rather large masses. Rings of cells surround these masses, giant cells appear, and the obstruction of the lymphatics is aggravated. The phagocytes gradually make their way along the lymphatics, forming lymph nodes in their passage, until they reach the bronchial glands. The glands enlarge, fibrosis occurs, and dense bands of fibroid tissue are formed, which cause distortion of the alveoli, some of which are dilated while others are collapsed. The pathologic picture is sometimes complicated by the appearance of areas of acute pneumonia, which, if the course of the disease is prolonged, may undergo resolution, only to be followed by the appearance of a fresh area of pneumonia somewhere else in the lung.

ROENTGEN FINDINGS

It is obvious from the foregoing description that there is a tremendous variation in the roentgenologic picture, depending on the phase of the disease at the time of the examination. If the pneumonia lipoid is seen before it is complicated by an acute pneumonia, the predominating feature of the x-ray film is the presence of shadows caused by areas of consolidation, which are lacking in density and contain a large amount of fibrosis. The shadows lie immediately adjacent to the heart and mediastinum; they overlap portions of all the lobes of the lung, and their outer borders are rather sharply defined, so that there is an abrupt cleavage between the diseased and the healthy portions of the lung. After acute pneumonia occurs, areas of consolidation may appear anywhere in the lung field, often coalescing with the shadow of the area of lipoid pneumonia, and thus producing a complicated picture which often looks like tuberculosis. The differential diagnosis can rarely, if ever, be made from a single film, and it is only by viewing the films in series and carefully considering the patient's history that a correct diagnosis can be made.

COMMENT

The theory that the oils have no difficulty in reaching the lungs in the manner which has been described is supported by experimental, clinical and pathologic evidence. Laughlen proved that oil introduced into the nasopharynx of animals reached the lungs by way of the trachea. Pirie,[6] in discussing my previous communication, cited an instance of iodized poppy-seed oil 40 per cent being introduced into the lung while the subject slept. MacCallum[7] reported the frequent finding of fats and oils in the lungs at autopsy, though in most cases it had not produced the extensive changes herein described. The frequent use of iodized oil in the diagnosis of pulmonary conditions would seem to refute the contention that the oils are in themselves harmful, and that their presence in the lungs in the cases reported was only of secondary and not of primary importance. The use of iodized oil in any individual case is limited; it is not given several times a day over a long period of time, and it is rarely used in infants whose power of expulsion of foreign materials from the lungs is not as great as in older patients. The results of the experimental work which has been done on this subject show quite clearly that when oil is present in the lungs it is the primary, not a secondary, factor in the production of the associated pathologic changes.

CONCLUSIONS

Fats and oils are often aspirated into the lungs when given to young children either orally or by way of the nasopharynx.

After oils have been aspirated and they reach the alveoli of the lungs, they cause a profound and rapid reaction which represents an effort on the part of the lungs to expel the foreign material.

Extensive changes take place in the pulmonary structure in a few days. These changes are registered on the roentgenogram, but their interpretation is extremely difficult.

The roentgen findings in lipoid pneumonia often simulate those of tuberculosis, and it is almost impossible to differentiate these two processes, on a single x-ray film.

Pneumonia due to lipoids occurs but rarely, but a lively realization of its possible existence in any given case will lead to its more frequent detection.

6. Pirie, H. A., in discussion on Pierson, J. W.: Some Unusual Pneumonias Associated with the Aspiration of Fats and Oils in the Lungs, Am. J. Roentgenol. **27**: 572 (April) 1932.
7. MacCallum, W. G.: Personal communication to the author.

ABSTRACT OF DISCUSSION

DR. W. WALTER WASSON, Denver: There are two important points which Dr. Pierson has brought out: first, that oils are irritating to the lungs and, second, that oils once in the alveoli of the lungs can remain there for a great length of time. He reported sufficient experimental evidence to indicate the irritating qualities of these oils in the lungs. The literature contains a number of experiments on the subject of the irritating effect of oils on tissue, as well as the pathologic reactions resulting from the injection of oils into tissue. Lipoids in the lungs have been found to be irritating. Therefore the question becomes one of just how long oils can remain in the lungs without setting up a reaction. Dr. Pierson's patients are infants within the first few weeks of life. That brings up the question of the physiologic functioning of the respiratory tract in young infants. The clearing of atelectasis after birth is not the simple process that it is ordinarily thought to be. It is not a simple mechanical process. It does not just happen within a few minutes after delivery. The lungs are not easily or readily aerated, nor is there a rapid and complete clearing of the atelectasis or removal of all the mucus from the bronchi and trachea. On the other hand, the clearing and aeration of the lungs are slow processes, and they depend on the vigor and ability of the particular infant to remove the mucus from the bronchi and trachea. Cases of stridor are seen which are nothing other than instances of mucus in the bronchi and trachea. Some infants seem to achieve pulmonary clearing with relative ease, while to others it is a complicated and often hazardous process. Dr. William C. Johnson has reported cases of amniotic fluid within the bronchi and trachea aspirated during intra-uterine life and at the time of birth. Some of these babies died soon after delivery and some lived for a few weeks or months. At necropsy, he found that the amniotic fluid had set up an irritation within the bronchi and alveoli which resulted in fibrosis, atelectasis and pneumonia. Such infants are highly cyanotic and are unable to clear the lungs; consequently they usually die soon after birth. If, then, one considers the situation of an infant's inability to clear the respiratory tract of foreign material, and if oil is put into the nasopharynx or aspirated during the feeding, it is easy to understand how this oil may remain within the lungs and

alveoli for a considerable period. If one adds to this the mental image of the irritating qualities of the oil, one is better able to understand the resulting pneumonias which Dr. Pierson has shown. Of course, one must always suspect an underlying condition which may make these pneumonias possible, but I believe it is possible to have pneumonias of the type described by Dr. Pierson. All are familiar with foreign bodies in adult lungs and with the massive collapses reported but do not stop to analyze the possibilities of pneumonias from foreign bodies or foreign materials in infants.

DR. JOHN F. HERRICK, Ottumwa, Iowa: During the recent war a great many men were disabled from the inhalation of the toxic gases used in warfare. I have personal knowledge of a large number of cases treated by injection of liquid petrolatum into the trachea and lungs to relieve the irritation. The absolutely irrepressible cough nothing would stop, but the liquid petrolatum did mitigate it. I have wondered whether any one who had any experience with those cases later came to know whether in the adult such conditions as Dr. Pierson has described in infancy and in childhood would develop. As I understand it, Dr. Gilchrist, who had charge of this work following the close of the war, stated that the lungs cleared up after these toxic gases, notwithstanding the fact that there were cases in which casts of the trachea and bronchi were coughed up, and in which bleeding from the mucous membrane continued for weeks at a time, in which this combination of liquid petrolatum with a little camphor was used for days and weeks to allay the irritation. I should be pleased to know whether anybody has had experience with those cases later, and whether they correspond with the cases reported by Dr. Pierson.

DR. J. L. DUBROW, Memphis, Tenn.: Dr. Pierson's paper applies, as I understand it, only to children. It would be interesting to know whether any adult cases came under his observation in which oils were injected into the trachea for diagnostic or therapeutic purposes and pneumonic processes were set up. I have given quite a number of injections of iodized poppy-seed oil 40 per cent. I have roentgenographed the patients and have seen that oil is retained in some for from eight to ten months but have never come across any pneumonic complications. On the other hand, in some cases, especially of bronchiectasis, the patients seem to benefit from the oil.

DR. JOHN W. PIERSON, Baltimore: The cases that I reported occurred in very young children, who do not have great power of expulsion. The bulk of the changes were found in the posterior portion of the lungs. I think the fact that they retained these oils for a long time has been due to their lessened vitality and lowered physical condition. Dr. McCallum, in talking over this question, said that the members of the department of pathology were perfectly amazed at the frequency with which they found foreign materials in the lungs, all sorts of food materials which the children had vomited and then aspirated during regurgitation. They said that after their attention had been drawn to this subject they had found foreign materials in the lungs in many, many cases.

The Treatment of Tuberculosis.—The most important principle in the treatment of pulmonary tuberculosis is rest. Rest that is regulated as is possible only in a sanatorium; rest that takes into consideration the activity of the disease, the degree of toxemia, and the psychology of the patient. The second principle is that known as "fresh air," a term with the widest significance referring to the air breathed, which should, theoretically, be pure, dry, and moderately invigorating; and referring equally to the air which comes in contact—and incidentally should be allowed to come freely in contact—with the skin. This air should also be dry, and preferably cool and in constant gentle motion. The third principle is exercise: exercise regulated with the greatest care and alternating with rest. But exercise does not come into the picture until the activity is controlled and the absorption of toxins ceases to be a disturbing factor. With these principles it is possible to go far in the arrest of pulmonary tuberculosis, and it would be possible to go much further if the cases were recognized and treated in the early stages.—Davies, H. M.: Lung Collapse Therapy, *Lancet* **2**:274 (Aug. 6) 1932.

Clinical Notes, Suggestions and New Instruments

"MASQUE ECCHYMOTIQUE" CAUSED BY JUGULAR OCCLUSION FROM AORTIC ANEURYSM

H. L. ARNOLD, M.D., HONOLULU

A Portuguese, aged 60, seen in March, 1930, complained of cough only. On examination he presented the classic syndrome of aneurysm of the arch, except for the absence of murmur or bruit. There was brassy cough, hoarseness and tracheal tug. Roentgen examination showed an aneurysm. The blood pressure was 160 systolic and 100 diastolic. The Wassermann reaction was ++++, the Kahn reaction +. The urine was normal. There was moderate dyspnea on exertion. He received antisyphilitic treatment, iodides and bismuth compounds only.

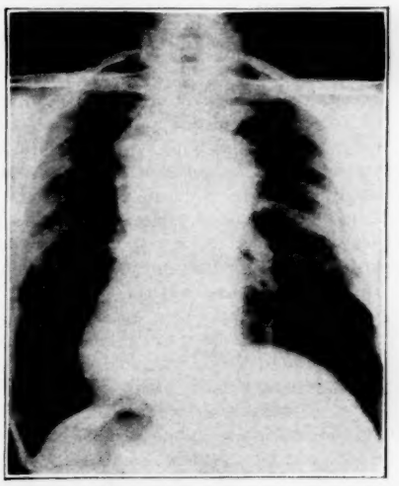

Fig. 1.—Aortic aneurysm.

He remained at home as a semi-invalid until death. He had periodic attacks of pain and dyspnea, which were relieved by codeine. Roentgenograms from time to time showed slow increase in the size of the aneurysm.

During the night of April 20, 1932, he had an unusually severe attack of pain and dyspnea which did not respond to codeine. He was seen at 3 p. m., April 20. There was urgent dyspnea with noisy expiration and inspiration, the sound being that of a compressed trachea, without râles or rhonchi. The spectacular thing was the terrific cyanosis of the head and neck. Above the shirt band

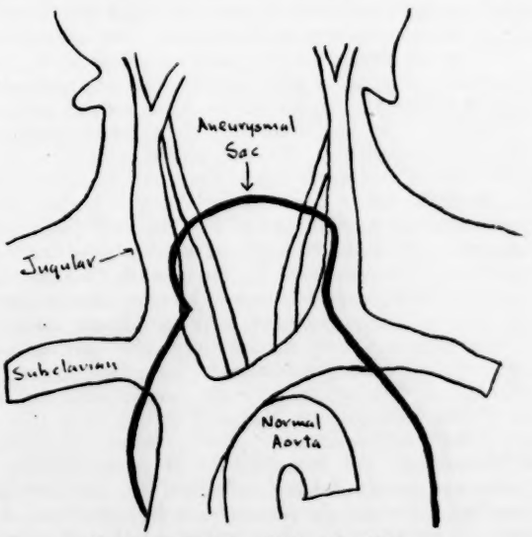

Fig. 2.—Schematic sketch of relations.

line the entire neck and head were livid, the superficial veins enormously dilated but not pulsating, the eyes proptosed. There was no cyanosis elsewhere. He had agonizing pain in the upper sternal region. He could not speak. Blood pressure was only slightly elevated. Morphine gave only slight relief. He died three hours later without any marked change in his appearance.

After death there were scattered small extravasations over the neck and face. The embalmer stated that when the embalming fluid was injected a stream of bloody fluid con-

tinued to flow from the left eye. Only a limited autopsy was permitted after the embalming.

The sketch shows well what was found. The aneurysmal sac had yielded on its greatest convexity and had invaded the base of the neck, compressing the jugulars laterally above the subclavian trunks. The sac in this region was paper thin, elsewhere being much thicker. There was only moderate aortitis, with few plaques. No tissue was removed.

The case is reported because of the unusual manner of death. Venous compression of the jugulars from aortic aneurysm with the subclavians spared seemed hard to explain. The lack of valves in these veins of course added to the congestion. The facies was exactly that of the "masque ecchymotique" of mediastinal disease.

The Clinic.

ACUTE HYPERCALCEMIA: REPORT OF A CASE

HARRY LOWENBURG, M.D., AND THEODORE M. GINSBURG, M.D.
PHILADELPHIA

A fairly exhaustive review of the literature revealed no report of acute hypercalcemia or of acute poisoning with parathyroid extract in man. The symptoms of overdosage not being well known, it is perhaps not unlikely that such a state could have been produced without recognition, the use of parathyroid extract, for a wide variety of indications, of late having become very extensive. The following case presented a diagnostic problem of considerable magnitude for some time before its solution was discerned:

E. W., a white boy, aged 5 years, was being treated for a severe case of purpura hemorrhagica. In addition to other measures such as transfusions and antivenin, he was given daily intramuscular injections of calcium gluconate and parathyroid extract, as well as calcium gluconate by mouth. One cc. (20 units) of parathyroid extract was ordered to be given daily, but by accident he received instead 1 ampule (5 cc., or 100 units). This was given for six days before the mistake was noted and the cause of the condition was recognized.

Vomiting began on the second day of administration and gradually increased in severity; this was apparently the earliest symptom. On the third day the child began to become listless and responded slowly to questions. On the fourth day, vomiting became pronounced and the general physical depression more severe. This continued until on the fifth day the patient's condition was considered critical. He was extremely lethargic, apathetic, listless. He replied very slowly and only to questions requiring answers of one or two words. He paid practically no attention to strong stimuli, such as pinching or shouting, and he held a lollypop, to which article of diet he had previously evinced a strong attachment, in his hand without any attempt at ingestion. The lids drooped and he made practically no spontaneous movements. He was almost unable to sit up in bed by himself, requiring much time and maneuvering. He had a high, irregular fever throughout this period, the temperature reaching as high as 103 F. The knee jerks could not be obtained. (Visible bleeding had stopped after the first day of treatment. On the second day the bleeding time had fallen to five minutes and ten seconds from a bleeding time on admission which had not been concluded after two hours' observation.)

It was suggested that the condition was perhaps a serum reaction without skin manifestations. Another suggestion was a subarachnoid hemorrhage. Finally, on the sixth day, a diagnosis of hypercalcemia was suggested by one of us (Ginsburg), after the error in the amount of parathyroid extract injected had been discovered. An immediate blood serum calcium determination was made and found to be 19.6 mg. per hundred cubic centimeters. Serum phosphorus coincidentally was 4.4 mg. Serum calcium taken two days before parathyroid extract was started, which could therefore serve as a control, was 10.2 mg. per hundred cubic centimeters.

In the absence of any available standard treatment or of a rational specific for this condition, it was considered best not to attempt measures which could perforce be only experimental. The administration of parathyroid extract and calcium was, of course, immediately stopped and the patient placed on continuous venoclysis of physiologic solution of sodium chloride (after the method of Karelitz and Schick[1] as employed in the Mount Sinai Hospital of New York), with a view toward aiding the excretion of calcium and possibly of parathyroid extract and to dilute the blood, which, at least in animals, is said to become very viscid and decreased markedly in volume (Collip,[2] Dragstedt,[3] and many others).

On the following day the serum calcium fell to 14.1 mg. per hundred cubic centimeters, the temperature gradually became normal, vomiting stopped, and the physical depression had much improved. Venoclysis was stopped, 1,100 cc. having been given. The next day serum calcium was 12.1 mg. and the patient seemed to be normal. By the fourth day the patient presented no abnormalities, the calcium was 10.9, and phosphorus was 3.0; on the fifth day the calcium was 11.0 and phosphorus 3.0; on the seventh day the calcium was 10.4, and on the ninth day the calcium was 9.7 and the phosphorus 3.7. On the eleventh day after parathyroid extract was stopped the patient was discharged, asymptomatic.

A roentgenographic study of the long bones seven days after the parathyroid extract had been discontinued was entirely negative for absorptive or other changes. It was thought that the very high blood calcium level over a period of time might possibly have caused such changes, as in cases of osteitis fibrosa cystica associated with parathyroid tumors or in experimental chronic hyperparathyroidism.[4]

The symptomatology noted is little different from that reported by a great many workers as occurring in animals with experimental hypercalcemia, with the exception of the high temperature. We have come across no reports of temperature studies in the literature. It is possible that the hyperpyrexia was due to the increased blood viscosity and diminished blood volume reported by experimental workers in animals, as in ordinary dehydration states. It is also possible, of course, that the temperature elevation may have simply been an unrelated coincidence.

The treatment of overdosage with parathyroid extract can, of course, be nothing but experimental at present. We have already mentioned the rationale of continuous venoclysis. It is possible that magnesium may be a semispecific; but Matthews and Austin[5] examined this question experimentally and were unable to come to this conclusion. It is suggested that the administration of calcium be part of the treatment, although this was not done in the present case, for the following reason: The hypercalcemia is not due to the presence of a superabundant source of calcium but is due to a hormone, the quantity of hormone, for the most part, determining the level of the blood calcium. If calcium is not supplied to the organism it is reasonable to assume that the presence of the hormone in excess will lead to absorption of calcium from other sources as, for example, the bones, in order to maintain the high level in the blood, in this way leading, perhaps, to bony changes like those of von Recklinghausen's disease. In the present case no such changes were observed in the long bones by roentgen examination one week after the parathyroid extract had been stopped in spite of the fact that calcium had been simultaneously stopped.

CONCLUSION

It is evident that parathyroid extract is a powerful agent not without danger and that its administration should be accompanied by careful attention to the possible development of symptoms of overdosage. The earliest of these apparently is vomiting, and its onset in a patient receiving parathyroid extract should immediately be checked by a blood calcium determination. (Wherever possible it is best, of course, that the administration of parathyroid extract for any purpose be always checked by blood calcium estimations.) Treatment at present lacks secure foundation.

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From the Pediatric Service of Dr. Harry Lowenburg, Mount Sinai Hospital of Philadelphia.

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5. Matthews, S. A., and Austin, W. C.: Effect of the Blood Calcium Level on the Tolerance to Magnesium: Some Observations on Hypercalcemia Induced by the Parathyroid Hormone, Am. J. Physiol. **79**: 708 (Feb.) 1927.

Special Article

THE FUNDAMENTALS OF ELECTROCARDIOGRAPHIC INTERPRETATION

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FOREWORD

Electrocardiography has been gradually establishing a place for itself in clinical practice. Nevertheless, a large number of physicians have not been able to develop a working knowledge of the subject. For this reason THE JOURNAL presents a series of articles outlining the fundamentals necessary to understanding it. In the preparation of this series, various other contributions on the subject have been consulted and the statements of authors rewritten, rearranged or left practically unchanged to meet the requirement of simplicity and clearness. This is not a report of research. Instead, Dr. Carter has avoided the points that are still debatable. In the preparation of the material, Drs. Arno B. Luckhardt, Samuel R. Slaymaker, N. S. Davis III and L. N. Katz, Mr. W. B. Andrews and Mr. H. J. Holmquest have aided with suggestions and advice. The electrocardiograms and case histories have been developed from the collections in the Central Free Dispensary, Passavant Memorial Hospital and the Cook County Infirmary, and are from the departments of Dr. Samuel R. Slaymaker, Dr. C. C. Maher and Miss Myrtle Sands.

It is realized that the vast majority of physicians are not in themselves possessed of the necessary apparatus for electrocardiographic studies. Nevertheless, such service is now available in many hospitals, clinics and laboratories. Following is an outline of the presentation of this subject to be followed in this series of articles.

THE EDITOR.

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INTRODUCTION

Electrocardiography was born with the introduction of the string galvanometer, by Einthoven of Leyden in 1903. It had been known since 1856 that the contraction of the heart was accompanied by the production of differences in electric potential, for Kölliker and Müller at this time had demonstrated the fact in an experimental laboratory, using the heart of a frog. Likewise in 1887, Waller, working in a physiologic laboratory, had demonstrated that these differences of potential could be recorded by means of a capillary electrometer, if only a proper contact was made between the wires from the electrometer and any two areas of the body which included the heart between them. This instrument, however, was totally inadequate to record with any degree of accuracy these quickly varying potentials of the heart beat, so physiologists and physicians were forced to await the development of a more sensitive instrument before reaping the benefits which graphic methods, in the study of heart disease, have conferred on clinical medicine. It may justly be said that, now, a cardiovascular examination is not complete without an electrocardiogram.

THE VALUE OF THE ELECTROCARDIOGRAM IN CLINICAL PRACTICE

Graphic methods have placed the entire question of cardiac irregularities on a rational basis. They have given the clinician the confidence of knowledge in diagnosis. They have rendered prognosis more exact. They have rationalized therapy.

Although it is true that one who is skilled in electrocardiography and has carefully studied the associated clinical manifestations of disordered heart action seldom needs to resort to this graphic method in diagnosis, such a state of affairs does not necessarily condemn the method as having no place in clinical medicine. The ultimate goal in the use of all instruments of precision is to dispense with their use when all that they may teach has been learned. This stage, however, has not been reached with electrocardiography in diagnosis, and less so in prognosis and treatment.

It should, however, be used as an adjunct to other clinical methods, since experience has repeatedly shown that, as with other laboratory methods, one should not make a positive diagnosis from the electrocardiogram alone. While it has a definite place in clinical practice, it cannot replace the customary methods of history taking, percussion, auscultation and roentgenology, in making a diagnosis. It does, however, obviate in large part the need of taking mechanical graphic records of arterial and venous pulses and of the apex impulse. Since a perfectly normal electrocardiogram may be obtained in the presence of serious heart disease, the method must be considered as merely helpful and supplementary. It does, nevertheless, frequently reveal pathologic conditions not readily demonstrated by other methods of diagnosis.

The irregularities of the heart often confound the physician. The electrocardiogram is the final court of authority in all these cardiac irregularities. Frequently, thorough physical examination is all that is required for diagnosis, but at times certainty is possible only by employing graphic methods; and even then, as in necropsies, the diagnosis may occasionally fail to be clear.

Determination of the actual disturbance in the cardiac mechanism is important because the prognosis and management often depend on the nature of the disturbance present. Thus, sinus arrhythmia, the commonest of these irregularities, and one usually having no clinical significance, may, especially when complicated by extrasystoles, be confused with auricular fibrillation, a condition usually associated with definite organic heart disease and having a relatively serious prognosis. Likewise, the significance of extrasystoles is different from that of auricular fibrillation. Extrasystoles from multiple foci are more serious than are those arising from a single focus. Multiple ventricular extrasystoles may be forerunners of ventricular tachycardia and ventricular fibrillation; they indicate a bad prognosis. Paroxysmal ventricular tachycardia is more significant than is the auricular or nodal form, since it is more commonly a precursor of ventricular fibrillation. More significant still is the differentiation of auricular fibrillation and partial A-V block with dropped beats, since the proper treatment of the two conditions is radically different. Digitalis is of great benefit to the patient with auricular fibrillation, whereas it is contraindicated in cases of uncomplicated partial block, since it may cause the condition of partial block to become one of complete block, a much more serious condition.

Clinical recognition of milder forms of heart block is difficult, often impossible, without graphic methods. This is especially true when the partial block is of the type that consists of prolongation of the P-R interval. This, however, is one of the frequent early manifestations of rheumatic heart disease, and occasionally the only means of diagnosing myocardial involvement in a case of rheumatic fever. At times, complete A-V block, partial 2:1 block, and sinus bradycardia can be differentiated only with the aid of an electrocardiogram.

Graphic evidence of myocardial involvement may be in the form of certain alterations of the P wave, giving evidence of auricular myocardial involvement; of characteristic changes in the Q-R-S complex and T wave indicating ventricular myocardial involvement. When slight, it is often difficult to decide whether the changes in configuration are within normal limits or not. Also, in elderly patients, in whom a certain degree of myocardial fibrosis and coronary sclerosis is considered normal, it is often impossible to make a definite diagnosis of myocardial damage. The electrocardiographic evidence of myocardial involvement must always be correlated with the clinical observations, there being only a few instances in which graphic evidence is of significance without such reference; viz., in recent coronary occlusion, in overdigitalization and in bundle branch block. So-called low voltage does not always indicate myocardial damage, since it may result from a decrease in the resistance of the body shunts or from a more horizontal position of the heart in the anteroposterior plane of the chest. The degree of abnormality of the electrocardiogram does not parallel the amount of cardiac damage, since the heart, like the brain, has many silent areas, extensive involvement of which may lead to little or no change, while, on the other hand, a slight, localized lesion in one of the bundle branches gives rise to extensive alterations in the graphic record. Hence it may be seen that the electrocardiograph records changes in the functional properties of the heart; it registers anatomic changes only when they disturb these functions of the heart. The force of the cardiac systole, that is, the magnitude of the heart's contraction, and the efficiency of the heart as a pump, cannot be judged by graphic methods.

The electrocardiogram gives no information as to the etiology of myocardial involvement, except in the case of the peculiar changes caused by digitalis or by a recent coronary occlusion, and even here it may give misinformation. There is nothing in the graphic record to show whether the involvement is organic, toxic, or the result of ischemia; the clinical observations must determine this. Reliance should not be placed on T wave changes alone in detecting digitalis intoxication. Digitalis may not cause the typical T wave inversion. It may produce almost any type of electrocardiogram. The "digitalis T wave" may occur in other conditions.

Whereas the shape of the curves in the three leads of the normal electrocardiogram is constant for the individual over long periods of time, even to the extent of having a value in identification, nevertheless a recent coronary occlusion produces a series of alterations in the record which change from day to day. By following the rapidity of these changes, some idea of the rate of recovery or progress can be reached. Therefore, in all such cases, a series of records should be taken, since more conclusive evidence regarding the lesion may be obtained from a series than from a single record. At times, coronary occlusion may lead to nonspecific changes in the electrocardiogram; viz., "low voltage," bundle branch block, extrasystoles, paroxysmal tachycardia or fibrillation. Occasionally clear cut cases of the condition may occur without any noticeable change in the electrocardiogram. On the other hand, any condition, other than coronary occlusion, which causes myocardial ischemia, as coronary sclerosis with loss of elasticity, may give rise to changes in the electrocardiogram indicative of coronary occlusion. While the occurrence of striking and distinctive changes in coronary occlusion is important in differentiating this condition, especially atypical attacks thereof, from acute abdominal conditions (in which operative intervention might result seriously) it is nevertheless poor policy to ascribe to coronary occlusion an electrocardiogram showing minor changes.

The diagnosis of ventricular preponderance is made only when, in addition to the electrocardiographic changes of axis deviation, it is known from other evidence that the heart is enlarged.

The electrocardiogram aids in treatment by determining the exact nature of the arrhythmia present, by serving as an important aid in following the progress of a case of coronary occlusion, and by indicating the stage of digitalization reached in the patient being observed. Frequently the conversion of an auricular fibrillation to the normal mechanism may be missed, owing to the fact that the digitalis has induced so many extrasystoles that, clinically, the predominant normal rhythm cannot be distinguished from fibrillation, which is considered to be still present. In such a case, the inadvisability of continuing medication is obvious.

PHYSIOLOGIC BASIS OF ELECTROCARDIOGRAPHY

The successive contractions of the auricles and ventricles are due to the passage of an electrical excitation wave, which precedes, by a brief interval, the contraction of the heart chambers so stimulated. This

"impulse," as it is called, is originated and conducted by a peculiarly differentiated muscle tissue comprising the S-A node (also called the sinus node, the sino-auricular node, the Keith-Flack node and the pacemaker, all synonyms); the A-V node (also called the auriculoventricular node, or the node of Aschoff and Tawara, these likewise being synonymous terms); the bundle of His, and the right and left bundle branches with their arborizations (fig. 1 *A*). The impulse normally originates from the pacemaker, located at the head of the S-A node, a minute club-shaped mass of tissue located in the sulcus terminalis on the posterior wall of the right auricle, at the junction of the superior vena cava. From this focus it spreads over the right auricle in all directions, much the same as waves spread when a pebble is dropped into water (fig. 1 *B* and *B*[1]). The impulse on reaching the posterior auricular wall spreads (by the posterior auricular band) to the left auricle; likewise, on reaching the region of the junctional tissue, it spreads to the ventricle through the A-V node and bundle (fig. 1 *D* and *F*). A slight delay occurs in passing this junction, but once across, the impulse spreads with great velocity over the common bundle, its right and left branches and on to the Purkinje network lining the interior surfaces of the ventricles (fig. 1 *F*). The bulk of the ventricular musculature is then excited by a slower passage of the impulse from the interior to the exterior surface of the ventricles.

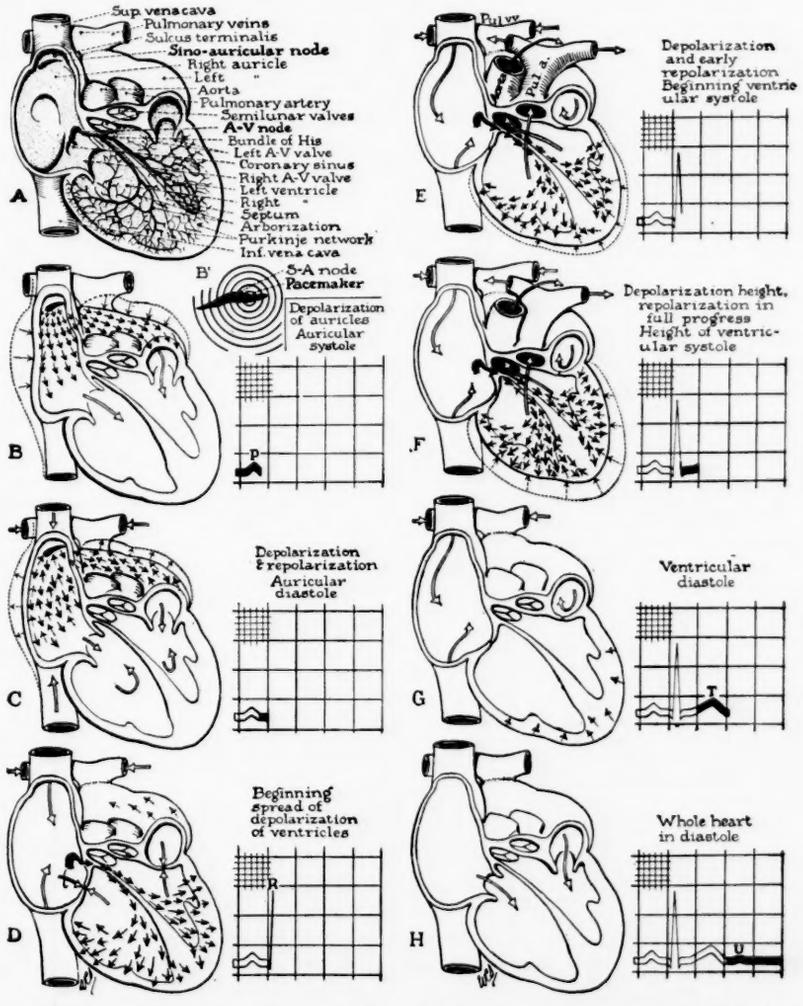

Fig. 1.—Various stages of the cardiac cycle with the associated electrocardiographic record. Note that electrical events precede by a brief interval the mechanical events of the cardiac cycle: *A*, diagrammatic sketch of the conduction system of the heart. *B*, the heart at the stage of auricular systole. The electrical excitation is spreading throughout the auricular musculature. This is the stage of depolarization of the auricles. At this stage the P wave is inscribed. *B'*, a diagram to illustrate the manner in which the excitation wave spreads from the upper part of the S-A node throughout the right auricle, in all directions, at almost uniform rates. *C*, the heart during the stage of auricular relaxation. Depolarization of the auricles is in progress but repolarization has begun. The finale of auricular systole is represented graphically by the space in black extending from the end of the P wave to the beginning of the Q-R-S complex. *D*, the heart at the beginning of ventricular excitation. This is the stage of depolarization of the ventricles. The graph extends from the beginning of the Q-R-S complex to the peak of R. *E*, the heart at the onset of ventricular systole. The excitation wave is spreading through the ventricles; depolarization is beginning. The graph extends from the tip of R nearly all the way down S. *F*, the heart is at the height of ventricular systole. Here depolarization continues, but repolarization is also in full progress. *G*, the stage of relaxation of the ventricles; the stage of repolarization of the ventricles, the process of depolarization having been completed. *H*, the whole heart in diastole. Except for a U wave, which is occasionally present, the graph does not vary from the iso-electric base line.

ORIGIN AND ACTION OF THE HEART CURRENTS

It has long been known among physiologists that if two electrodes are placed on a resting, uninjured cell, no deflection of the galvanometer can be detected, and the record obtained has the form of a horizontal (iso-electric) line (fig. 2 *A*). In the case of an injured cell, a difference of potential is developed between injured and uninjured regions; the current of injury flows. If electrodes are placed on these areas, a deflection occurs, and the new level is maintained until the polarized state has been restored in the injured area (fig. 2 *B*). If the injured cell is stimulated, and the recording electrodes have been placed, one on an uninjured portion and the other on the injured region of the cell, a monophasic action current will be recorded, showing the changes occurring in the uninjured region of the cell (fig. 2 *C*). The abrupt rise of the curve represents depolarization; the more gradual decline results from repolarization of the same region. The direction of this current is determined by the side of the galvanometer into which the electrode on the uninjured region is led. Hence by reversing the electrodes one obtains a mirror image of the one originally recorded (fig. 2 *D* as compared with fig. 2 *C*).

If an uninjured cell is activated, the curve recorded (fig. 2 *E*) is different from the foregoing (fig. 2 *C* and *D*) in that here the action current is diphasic instead of monophasic. Such a curve (fig. 2 *E*) has a larger and more angular initial phase than final phase. The contour of such a (diphasic) curve depends on the relative position of the stimulating and recording electrodes. The record obtained when the stimulating electrodes are applied at one end of the cell is the mirror image of that obtained when they are applied at the opposite end (fig. 2 *F* as compared with fig. 2 *E*). Each of the two electrodes used in obtaining this curve gives a monophasic curve opposite in direction (sign) to that given by the other electrode. Such a diphasic curve is therefore the algebraic sum of the oppositely directed monophasic curves recorded by each electrode, and its form depends on the differences in amplitude, contour and duration of the two component monophasic curves and on the asynchronism of their onset (fig. 3 *A*, *B*, *C*, *D* and *E*).

In the case of the electrocardiogram, the curve recorded is obtained by indirect leads (fig. 5) and differs from the foregoing diphasic current, which is obtained by direct leads, in certain respects. In direct leads the greatest influence is exerted by the region beneath the electrodes, whereas in indirect leads the disparity in influence of various regions is absent or minimized. Hence, with indirect leads, one is dealing

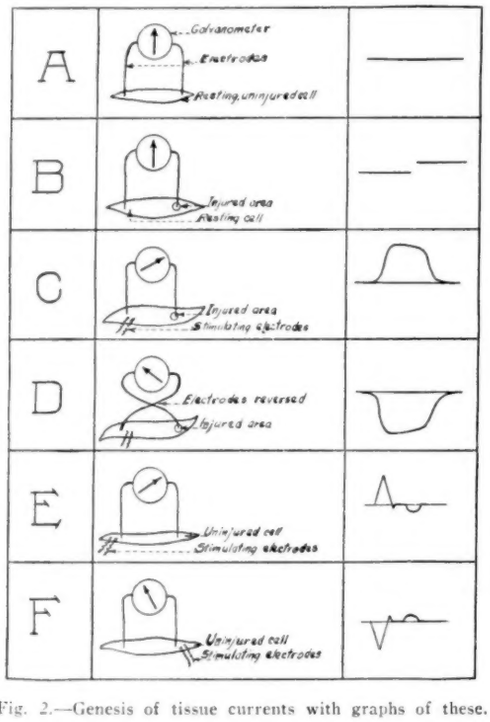

Fig. 2.—Genesis of tissue currents with graphs of these.

less with the changes in polarization of individual regions and to a much greater extent with the spread of depolarization and repolarization throughout the heart. The record obtained, therefore, represents the algebraic resultant of the electrical stresses occurring from moment to moment oriented in the direction of the lead employed. The active heart, in situ, considered as an electric battery surrounded by a relatively large mass of a conducting medium, varies in potential and in the position of its poles during each cardiac cycle, and thereby gives rise to the various waves of the electrocardiogram. The electrocardiogram records only the site of impulse initiation and of the spread and retreat of activity in the sense of depolarization and repolarization; it detects the presence of freshly injured regions. *It does not record the force of the heart beat* (figs. 116 and 117). The magnitude of contraction of the ventricles is the sum of the magnitude of contraction of all the fractions thereof, with little loss in summation, whereas the magnitude of the deflections is the summation of the electrical stresses in these fractions, with a tremendous loss in summation.

The electrocardiogram pictures the time relations of the spread of depolarization and repolarization in the heart. The P-wave (fig. 1 *B*) represents the stage of invasion of the auricles; the Q-R-S complex (fig. 1 *D*, E and F) represents the stage of invasion of the ventricles, while the T wave (fig. 1 *G*) represents the retreat of activity in the ventricles. The duration of each of these waves gives the time of invasion or retreat. The amplitude and contour of the waves represent the unbalanced stresses from moment to moment during these periods. The P-R interval (fig. 4) marks the conduction time from the S-A node to the ventricles (fig. 1 *B* and *C*). The period from the end of P to the onset of Q-R-S represents a period of retreat in the auricles (fig. 1 *C*). The presence of unbalanced electrical stresses usually makes the level of this period deviate from the iso-electric; that is, the isopotential. The S-T interval is a period of possession of the ventricles by the depolarized state. Some repolarization starts at this time; hence small deviations of level during this period occur normally (fig. 1 *F*). Large deviations from the iso-electric indicate that large regions of the ventricles fail to contribute their usual electrical stresses because of injury.

ELECTROCARDIOGRAPHIC TECHNIC

The technic of electrocardiography, as it is for the most part practiced today, consists in the photographic registration on a moving sensitive surface (paper or film) of the oscillations of a string shadow or of a reflected beam of light, coming from string or mirror properly mounted in an electromagnetic field and caused to move by minute changes of electric potential that enter from electrodes attached to the body surface of the subject. Any muscle in action produces an electric potential, its magnitude varying chiefly with the size of the muscle. When the subject rests in absolute repose, either recumbent or seated, most of the body muscles are inactive and the main muscular electric potential in the body, at rest, is that coming from the relatively massive muscle of the heart.

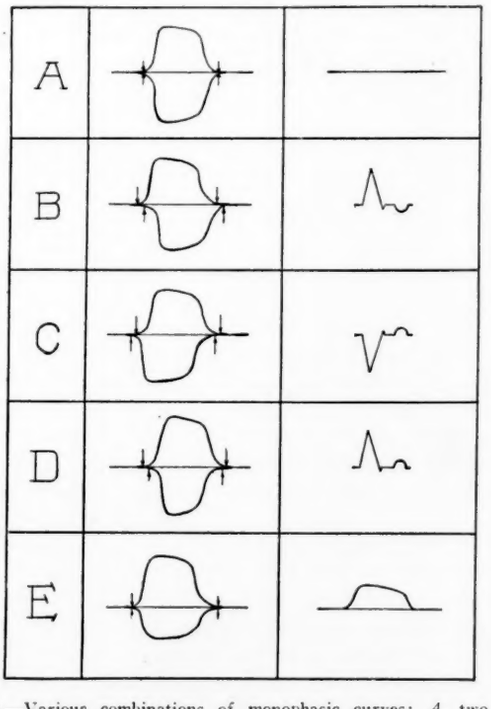

Fig. 3.—Various combinations of monophasic curves: *A*, two monophasis curves which have the same contour, amplitude and duration and start simultaneously, neutralize each other (since they are opposite in direction) and no deflection of the galvanometer is recorded. *B*, two monophasic curves which have the same contour, amplitude and duration but start asynchronously and give rise to a diphasic curve as recorded by the galvanometer. *C*, the direction of the diphasic curve depends on which monophasic curve starts first; compare *C* with *B*. *D*, if the monophasic curve that starts later also has the shorter duration, the final phase of the diphasic curve will be in the same direction as the initial phase. *E*, occasionally the two monophasic curves are synchronous, equal in duration, but different in amplitude, and give rise to a curve similar to *E* above.

An electrocardiographic lead is the connection of any two parts of the body by electrodes and wires with the recording instrument. Although two electrodes may be attached to any parts of the body to lead the heart

potential to the galvanometer (if they are not too close together), it has been found by experience that the most suitable lead points for routine clinical use are the forearms and the left leg. Ordinarily three leads (fig. 5) are registered for each patient studied, and these three leads have been universally and arbitrarily called lead 1, lead 2 and lead 3, respectively. Lead 1 consists of the connection of the right lower arm to one end of the

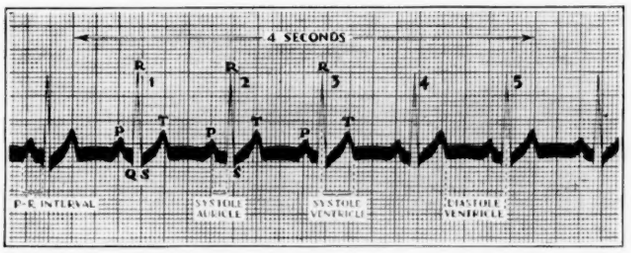

Fig. 4.—Electrocardiogram showing designation of deflections and their approximate relations to systole and diastole of the auricles and ventricles. Courtesy Sanborn Company.

galvanometer string and of the left lower arm to the other end so that the preponderant spread of the action current in the direction of the lead, that is, from right to left arm, is represented normally in the electrocardiogram by an upright deflection of the string shadow, while its reverse direction is represented by an inverted deflection. Lead 2 consists of a similar arrangement whereby the left leg is substituted for the left arm, whereas in lead 3 the left arm is substituted for the right arm, the left leg continuing to be the lower contact. Thus the three lead points, when connected, form a triangle, which can be considered to be essentially equilateral (fig. 7). Electrically and geometrically, lead 2 is equal to the sum of lead 1 and 3 and therefore P_2, Q-R-S_2, and T_2 should equal the sum of these deflections in lead 1 and 3, whereas P_2, Q-R-S_2 and T_2 minus the corresponding wave in lead 1 should give its value in lead 3, and similarly lead 2 minus lead 3 equals lead 1. This fact is often ignored, although useful clinically in checking up the accuracy of the standardization of the various leads.

THE PROCESS OF ELECTROCARDIOGRAPHY

The process of electrocardiography consists, briefly, in connecting the electrodes as comfortably and carefully as possible to the extremities of the patient (fig. 5), who should be completely relaxed and at ease, either recumbent or seated, and preferably as near the apparatus as is possible from a practical standpoint. Close proximity of the operator to the subject allows better cooperation and observation than is possible when they are widely separated; for instance, in separate rooms. The galvanometer and the light are switched on, the string shadow or reflected mirror beam is centered, and the time marker and camera are set. The connection (through the switchboard) is then made between lead 1 and the galvanometer. The process of neutralization of skin (body) current should then be accomplished. To do this, an equal current from a switchboard battery is thrown into the circuit in the opposite direction in the case of the string galvanometer, whereas, in the case of the oscillographic galvanometer the spot of light, if off center, is moved back to zero. With the string instrument, the current from the body is not thrown in full force, all at once, into the string circuit, but through several levels of extra resistance by shunts. This is done in order to prevent a relatively strong current from causing a sudden, wide, sharp deflection of the galvanometer string, which might cause it to break, or its metallic coating to become separated. The current from the lead is at first shunted so that its force is reduced to 1 : 100, and then it passes through a shunt of 1 : 10, and finally it is allowed to enter the string in full force. At each stage (shunt) neutralization of body current is accomplished. Then comes standardization, which means, in the case of the string galvanometer, the adjustment of the string tension, by loosening or tightening the string (generally by loosening it, since between records the string is kept taut for its protection), until its shadow on the camera moves sharply just 1 cm. when 1 millivolt of current is introduced into the circuit from the switchboard battery. This is the standard deflection employed internationally. More conveniently for greater accuracy, 3 millivolts is employed to cause an excursion of 3 cm. In the case of the oscillographic galvanometer, the standard is constant. With the string galvanometer, standardization for each lead employed is important, whereas, with the newer instrument only one standardization per patient (for all three leads) is required, and this can be made with or without the patient in circuit.

When these various steps have been completed, the record of lead 1 is made, and then the foregoing procedure is repeated for lead 2 and lead 3. A photographic film covering an interval of from six to fifteen seconds is usually sufficient for each lead.

The records are marked, developed, examined and filed. In the case of films, prints may be made if desired. There are advantages for each type of photographic record. Films allow good prints, are especially valuable when long strips are required, are relatively inexpensive, and may be used directly for interpretation.

Fig. 5.—Patient recumbent with the three electrocardiographic leads attached. Courtesy General Electric X-Ray Corporation.

An electrocardiogram is the accurate graphic record of the electrical activity of the heart being examined. It is composed, as previously stated, of three leads obtained by applying electrodes (fig. 5) to the right arm and the left arm for lead 1, the right arm and the left leg for lead 2, the left arm and the left leg for lead 3. The type and form of the record obtained varies with the lead employed. It is the movement of the string shadow or beam of light that causes the waves (deflections or complexes) of the electrocardio-

gram. These waves, chiefly three, have had certain letters attached to them. These letters were arbitrarily taken, by Einthoven, from the middle of the alphabet, and have no significance, per se, whatever. They have,

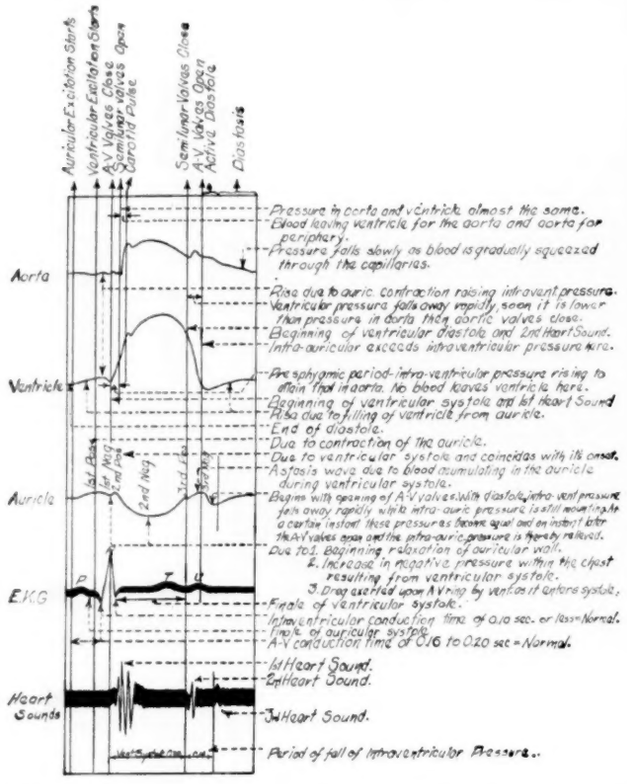
Auricular Excitation Starts
Ventricular Excitation Starts
A-V Valves Close
A-V Valves Open
Carotid Pulse
Semi-lunar Valves Close
A-V Valves Open
Active Diastole
Diastasis
Aorta
Ventricle
Auricle
E.K.G
Heart Sounds
Pressure in aorta and ventricle almost the same.
Blood leaving ventricle for the aorta and aorta for periphery.
Pressure falls slowly as blood is gradually squeezed through the capillaries.
Rise due to auric. contraction raising intravent. pressure.
Ventricular pressure falls away rapidly, soon it is lower than pressure in aorta then aortic valves close.
Beginning of ventricular diastole and 2nd Heart Sound.
Intra-auricular exceeds intraventricular pressure here.
Pre sphygmic period-intra-ventricular pressure rising to attain that in aorta. No blood leaves ventricle here.
Beginning of ventricular systole and 1st Heart Sound
Rise due to filling of ventricle from auricle.
End of diastole.
Due to contraction of the auricle.
Due to ventricular systole and coincides with its onset.
Ptosis wave due to blood accumulating in the auricle during ventricular systole.
Begins with opening of A-V valves with diastole, intra-vent pressure falls away rapidly while intra-auric pressure is still mounting. At a certain instant these pressures become equal and an instant later the A-V valves open and the intra-auric pressure is thereby relieved.
Due to 1. Beginning relaxation of auricular wall.
2. Increase in negative pressure within the chest resulting from ventricular systole.
3. Drag exerted upon A-V ring by ventricle before systole.
Finale of ventricular systole.
Intraventricular conduction time of 0.10 sec. or less=Normal.
Time of auricular systole.
A-V conduction time of 0.16 to 0.20 sec=Normal.
1st Heart Sound.
2nd Heart Sound.
3rd Heart Sound.
Period of fall of Intraventricular Pressure.

Fig. 6.—A diagram representing the approximate time relations of apical heart sounds, the electrocardiogram, and pressure changes in the right auricle, left ventricle and aorta.

as designations for the various waves of the electrocardiogram, become generally employed and are universally accepted (fig. 4). The first deflection, or auricular wave, is called P, the second deflection (a rapid succession of one, two or three deflections) is called the Q-R-S complex, and the third deflection is called the T wave. It is better to consider the Q-R-S wave as such, rather than separate it into any of its component parts, such as R or S. The Q wave is a relatively infrequent component of this complex.

The electrocardiogram obtained with the string type of instrument appears as a record on graph paper. With this type of electrocardiogram, the space between each vertical line represents 0.04 second, while the space between every fifth vertical (heavy) line represents 0.20 second. The space between each horizontal line is 1 mm. (equivalent to 0.1 millivolt of current after proper standardization of the instrument) while the space between every fifth horizontal (heavy) line is 5 mm. (representing a deflection of 0.5 millivolts standard current). Each electrocardiogram is standardized so that 1 millivolt of current causes a 10 mm. (1 cm.) excursion of the galvanometer string. Such standardization permits ready comparison of electrocardiograms from different instruments and laboratories.

With the newer instrument, the timing device has been rendered unnecessary, resulting in elimination of all horizontal and vertical lines on the film, which is mounted in a special holder, provided with three sets of rulings (located back of the film, when in place) representing time intervals by vertical lines, and string excursion by horizontal lines. The machine is so standardized that here, as before, 10 mm. ordinate equals 1 millivolt (1 mm. being equal to 0.1 millivolt of current) and 1 inch abscissa equals one second, that is, 0.04 second between thin vertical lines, and 0.20 second between heavy vertical lines.

Strict adherence to some routine for reading electrocardiograms will frequently prevent the clinician overlooking significant alterations or findings in the graphic record being examined. Such a method for reading electrocardiograms consists of:

1. Determining the rate of the heart.
2. Determining any axis deviation present.
3. Detecting and studying any irregularities of rhythm.
4. Looking for abnormalities of the P wave.
5. Determining the length of the P-R interval.
6. Examining for abnormalities of the Q-R-S wave.
7. Determining the length of the Q-R-S interval.
8. Finally, observing any abnormalities of the T wave that may be present.

A simple method for determining the heart rate from the electrocardiogram is to place a six-inch ruler below the record, count the heart cycles occurring therein, and multiply the number of these cycles by 10. This gives the heart rate per minute. If a six-inch ruler is not readily available, one may measure off on a cardboard the length of thirty large squares of the graph on which the tracing is recorded, and, using this as a measuring unit, then count the number of cardiac cycles occurring in this space (equivalent to thirty large squares) and multiply the number of these cycles by 10, and again one obtains the number of heart beats per minute. In the case of the newer records, one simply counts the number of cardiac cycles visible through the standard opening of the special electrocardiographic mount and multiplies by 10 to get the rate per minute.

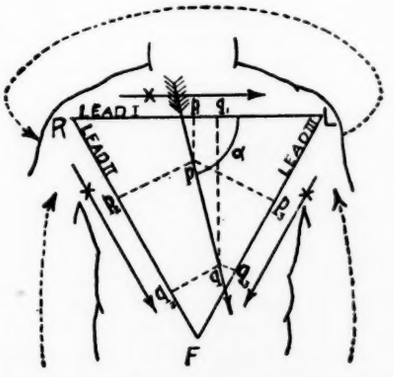

Fig. 7.—Relation of the differences in potential developed within the heart to those obtained by the three electrocardiographic leads. Each side of the equilateral triangle *R L F* represents one of these leads; *R L* represents lead 1, *R F* lead 2, and *L F* lead 3. An arrow (representing the axis of an electromotive force in the body) drawn through the midpoint of this triangle makes an optional angle (*a*) with the side *R L*. On this arrow, a line *p q* of optional length is taken, to represent such an axis within the heart, and its distribution along the sides of the equilateral triangle *R L F* is represented by $p_1 q_1$, $p_2 q_2$, $p_3 q_3$. The line $p_2 q_2$ is equal to the lines $p_1 q_1$ and $p_3 q_3$ taken together. The direction of the arrows (*x*) represents the flow of "current" in the various leads. The direction of flow in completing the circuit outside the body, through the galvanometer, is indicated by the long dotted arrows.

ARTEFACTS AND THEIR ORIGIN

Great care in technic is necessary to avoid artefacts in records, and great care in interpretation is necessary to avoid reading them into the interpretation of the electrocardiogram. Artefacts of intrinsic origin may arise from muscular tension, tremor or tic, voluntary muscular contractions, and high skin resistance. Artefacts from extrinsic sources are those due to high resistance of electrodes, varying resistance with polarity, loose or unclean contacts, extraneous currents, improper neutralization of skin current, inaccurate standardization, poor illumination, faulty action of time marker or camera, and defective development or printing of the

records. The most common artefact is that of overshooting, with deformity of the complexes. This is due to using too slack a string, necessitated by too high a resistance in the circuit.

WAVES OF THE NORMAL ELECTROCARDIOGRAM

All measurements of complexes should be made on the lead in which they are the greatest. This is usually lead 2, since it most often yields the string deflections of greatest amplitude. Therefore, analysis of abnormalities of shape of deflections and disturbances of

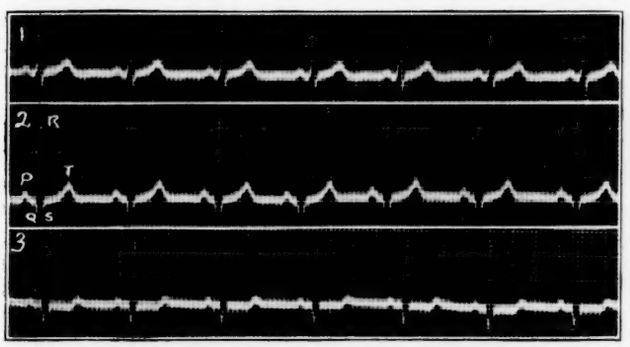

Fig. 8.—Normal electrocardiogram obtained by attaching the usual three leads to a healthy adult. Note the variation in amplitude of the separate deflections in the various leads. In the adult the Q-R-S complex is usually largest in lead 2 and smallest in lead 3. An inconstant deflection. Q happens to be present in leads 2 and 3 in this record. The P wave represents auricular, and the Q-R-S complex and T wave ventricular activity.

rate and rhythm of the heart is most satisfactory when lead 2 is used. Leads 1 and 3 should not be neglected, however, since at times they reveal information not contained in lead 2 (figs. 8, 9 and 122).

THE NORMAL P WAVE

The P wave is the auricular deflection. This wave occupies presystole. It is related to auricular systole. It represents the spread of the electrical excitation-action current through the auricular musculature. This precedes, by a brief interval, the wave of contraction in auricular systole. This wave of excitation originates from the normal point of origin of the heart beat, the pacemaker, located at the head of the sino-auricular node (which lies at the junction of the superior vena cava and the right auricle), and spreads throughout the auricles along its muscle bundles.

Normally the P wave is a blunt, round, sometimes slightly notched or scalloped upright deflection, from 1 to 3 mm. high. The P wave itself is of very short duration, representing only about one third of the duration of auricular systole. It is not more than 0.1 second wide (at the lower border of the base line), between corresponding points of upstroke and downstroke. Following the P wave there is a slight dip below the base line. This dip, which is usually concealed by superimposition of the Q-R-S wave, may at times be clearly seen in records showing heart block. This dip coincides in time with the remainder of the auricular systolic interval (finale of auricular systole), and is called the Ta wave, that is, the auricular T wave. The P wave may be upright, iso-electric, diphasic or inverted in lead 3 of a normal electrocardiogram.

THE NORMAL Q-R-S COMPLEX

The Q-R-S complex is the wave of ventricular systole. It is due to an impulse which has traversed the A-V bundle; its main divisions, the right and left bundle branches, and arborizations, which form the Purkinje network. This wave of excitation spreads through this system ten times as rapidly as through the ordinary cardiac muscle. The Q-R-S wave, normally, is a sharp, spikelike, monophasic, diphasic or triphasic complex, with a small (or no) initial downward projection known as the Q wave, a high upward projection known as the R wave, and a variable (usually slight to moderate) downward projection called the S wave. Normally the direction of this complex is predominantly upward. The form depends on the course taken by the impulse. The wave varies in form with an abnormal course of the impulse through the ventricle, or with an alteration of the direction of the cardiac axis (pregnancy), or with rotation of the heart. The height of this wave varies from 5 to 20 mm. All components of the Q-R-S complex should not measure over 0.1 second in duration. Occasionally this wave is notched in lead 3 of a normal electrocardiogram. These waves in lead 1 and lead 3 are used in the determination of axis deviation, as will be seen later.

THE NORMAL T WAVE

The T wave represents the finale of ventricular systole and terminates when all parts of the ventricles first become quiescent. It represents the process of relaxation of the heart, the decline or subsidence of the state of electrical excitability in the ventricular musculature. In other words, it represents the stage of retreat of this electrical activity, as contrasted with the stage of invasion which gives rise to the Q-R-S wave. Normally the T wave is a blunt or rounded upright deflection, varying from 1 to 5 mm. in height and having a maximum duration of 0.25 second. T_3 (third lead) is often inverted in the normal electrocardiogram. T_1 is especially valuable for study, since it not only shows many of the same changes observed in T_2, but often more marked and characteristic abnormalities, indicative of certain cardiac lesions. The T wave

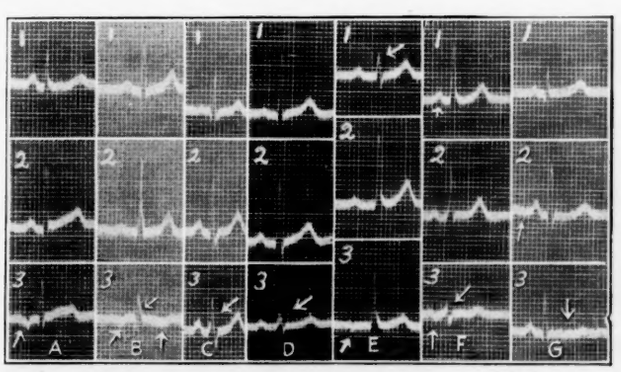

Fig. 9.—Seven electrocardiograms showing variations which are considered to be within normal limits: *A*, P_3 inverted and notched. *B*, P_3 inverted; Q-R-S_3 slurred, diphasic; T_3 inverted. *C*, Q-R-S_3 notched, diphasic, *D*, Q-R-S_3 low voltage, diphasic, notched. *E*, P_3 diphasic; Q-R-S_1 slurred. *F*, P_1 notched; P_3 inverted; Q-R-S_3 diphasic, notched. *G*, somatic muscle tremor in leads 2 and 3, due to the electrical activity of the striate muscle of the body. Note the variation in amplitude of the deflections in the various leads of the different records.

decreases in amplitude with increasing age of the patient. It is increased by exercise and in thyrotoxicosis, but this increase is without diagnostic significance.

THE NORMAL P-R INTERVAL

The P-R interval represents the auriculoventricular conduction time, that is, the time required for the excitation wave to travel from the S-A node through

the auricular musculature to the A-V node, through this node, the His bundle, and down to the upper reaches of the right and left bundle branches. It is measured from the beginning of the upstroke of the P wave to the beginning of the Q-R-S complex (whether this is upstroke or downstroke) and normally is less than 0.20 second in duration.

THE NORMAL Q-R-S INTERVAL

The Q-R-S interval represents the duration of intraventricular conduction time. It is less than 0.10 second normally.

THE NORMAL Q-T INTERVAL

The Q-T interval, from the onset of the Q-R-S wave to the end of the T wave, with good technic, is the best measure available for the duration of electrical ventricular systole. It varies primarily with the heart rate; with a rate of 45 it is 0.45 second, with a rate of 75 it is 0.35 second, while a rate of 120 per minute gives a Q-T interval of about 0.25 second.

THE NORMAL S-T INTERVAL

The S-T interval represents the short period of electrical balance between cardiac apex and base, immediately following the Q-R-S wave. This interval along with the T wave doubtless represent phases of the same

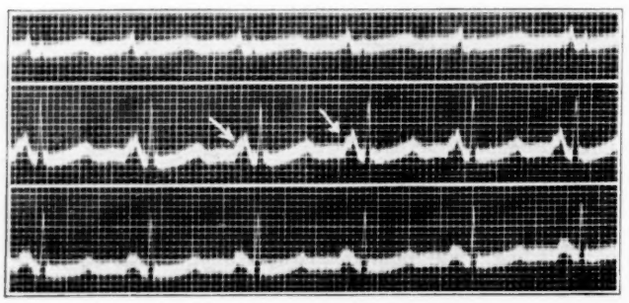

Fig. 10.—A record from a case of mitral stenosis showing a large P wave, most marked in lead 2, indicative of auricular hypertrophy. Note the diphasic Q-R-S_1.

electrical process during cardiac systole. Both are readily susceptible to modifying influences, physiologic, pathologic and toxic, which may produce changes in shape and amplitude. Its normal duration is from 0.24 to 0.28 second.

INDIVIDUAL WAVE CHANGES

All waves and intervals are best studied in lead 2, although leads 1 and 3 are not to be neglected, for reasons previously stated.

ABNORMAL P WAVES

The P wave is subject to frequent changes even when the heart is normal.

Increase in amplitude of the P wave above 3 mm. in height, or an increase in its width (duration) beyond 0.1 second is abnormal in a subject at rest (fig. 10). These changes may occur physiologically as a result of exercise, or from tachycardia induced by other means. A constant increase in height and width of the P wave is most often seen in, but is not diagnostic of, mitral stenosis, and congenital pulmonary stenosis. Both of these conditions, especially the former, are associated with considerable auricular enlargement. It is also seen in hypertension, especially with myocardial failure, in nodal (A-V) rhythm and tachycardia, and also occasionally in normal persons.

Decrease in amplitude of the P wave may occur in vagal depression of the S-A node with probable displacement of the pacemaker from the head of the node downward toward the tail, and is usually associated with slowing of the heart rate. It may result indirectly (vagal stimulation) from digitalis, pressure over the carotid artery, or with slowing of the heart rate at the end of expiration. Clinically it has been found in hypothyroidism, in which, with proper thyroid therapy, it may be caused to return to normal.

Notching is frequently associated with an upright P wave, which is usually abnormally high or wide. Such a P wave represents the spread of an impulse originating from an ectopic focus in or near the sinus node. The notching is frequently seen at the apex or in the descending limb of the P wave (fig. 9).

Inversion of the P wave in lead 2 is always abnormal; it denotes the presence of an ectopic rhythm (fig. 9). It occurs most commonly in the case of auricular extrasystoles. An inverted P wave appears whenever an auricular premature beat arises from an ectopic focus in the auricular musculature, that is, from an abnormally located point of origin, usually at a distance away from the normal pacemaker. If this ectopic focus is not far distant from the pacemaker, the P wave may be only slightly inverted or diphasic (partly upright and partly inverted), or it may be wholly upright and represent a premature beat arising in the normal pacemaker itself (near its center or tail) or at its border. An inverted or diphasic P wave is also associated with paroxysmal auricular tachycardia, where the impulses, originating from an ectopic focus in the auricle, recur regularly and rapidly at a rate of from 120 to 220 or more per minute. This condition may be likened to a rapid continuous series of auricular extrasystoles. An inverted P wave also occurs in the rare condition known as A-V nodal rhythm and in paroxysmal nodal tachycardia.

Retrogression may be considered a fourth cause of inversion of the P wave. Usually an early Q-R-S wave does not disturb the dominant sino-auricular rhythm of the heart, the normal P waves appearing at their usual equal interval in spite of it. Occasionally the ventricular premature beat spreads its influence directly to the auricles by way of the junctional tissue, and backward conduction gives rise to an R-P interval with an inverted P wave falling on the Q-R-S or T wave.

Absence of the P wave is most commonly due to auricular fibrillation. Here the irregular, rapid, fibrillary, auricular contractions usually manifest themselves as smaller waves. They occur at irregular intervals, at a very rapid rate of from 400 to 600 per minute, and vary in shape from slight convexities to high waves, which may almost resemble P waves. These waves are called f waves; they are counted with difficulty if at all. The P wave may be buried in the Q-R-S complex or in the T wave in cases of A-V block, of paroxysmal tachycardia, of extrasystoles (whether of auricular or ventricular origin), of reciprocal rhythm, of ventricular escape, and finally in cases of the rare A-V nodal rhythm. The P wave, in most instances of abnormal rhythm, does not exactly coincide with either the Q-R-S wave or with the T wave, and hence can usually be distinguished as a notching of the ascending or descending limb of one of these waves. P waves may be absent in cases of S-A block, that is, in cases of true auricular standstill, either transient or complete, as will be pointed out later.

(To be continued)

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

W. A. PUCKNER, Secretary.

PENTNUCLEOTIDE.—The sodium salts of the pentose nucleotides from the ribonucleic acid of yeast. Pentnucleotide is prepared from yeast nucleic acid by hydrolysis for twenty-four hours with 1 per cent sodium hydroxide solution. The lead salts prepared from the acidified hydrolyzed solution are decomposed with hydrogen sulphide and the liberated acids are concentrated and precipitated with alcohol. The sodium salts are prepared by neutralization with sodium hydroxide. The final product is approximately an 8 per cent solution of the sodium salts of what appear to be four nucleotides; the solution has a p_H of 7.2 and is preserved with cresol, 0.3 per cent.

Actions and Uses.—Pentnucleotide is proposed for use in infectious conditions accompanied by a leukopenia or neutropenia, such as agranulocytic angina. Immediately following the intravenous administration of pentnucleotide there is usually a sharp, temporary reaction characterized by dyspnea, precordial distress, bradycardia and sweating. Following intramuscular use, similar reactions have occasionally been reported but in milder form; generally no reaction occurs. On or about the fifth day following the use of pentnucleotide in cases marked by extreme lowering of the leukocyte count the total and differential white blood cell count begins to return to normal. With the return of the blood picture to normal there is a corresponding improvement in the clinical picture.

Dosage.—Usually 10 cc. is injected into the gluteal muscle twice daily for four days and thereafter once daily until definite improvement occurs. In desperate cases, 10 cc. diluted to 100 cc. with warm sterile saline solution is injected intravenously over a period of twenty minutes each morning for four days. In addition, 10 cc. is given intramuscularly once each night. After the fourth day, intramuscular injections only are given until definite improvement occurs. The product should not be administered within two hours after meals.

Manufactured by Smith, Kline & French Laboratories, Philadelphia, Pa. No U. S. patent or trademark.

Vials Pentnucleotide, 10 cc.

Pentnucleotide is a clear pale yellow solution having a mildly saline taste. The dry salt is very hygroscopic when exposed to air.

Treat 10 cc. of pentnucleotide with 10 cc. of hydrochloric acid and boil the mixture for two minutes: aniline acetate paper suspended in the vapors acquires a rose red color (*furfural from ribose*). Nearly neutralize the solution with stronger ammonia water, filter, make alkaline with ammonia water and set aside: a precipitate forms on standing. Filter and wash the precipitate with water, moisten with 0.5 cc. of diluted nitric acid and follow with 1 cc. of water; evaporate a few drops of the acid filtrate to dryness on a porcelain dish on a water bath, add 0.15 cc. of potassium hydroxide solution (10 per cent) and again evaporate to dryness: a brownish red coloration forms (*guanidine*). To a portion of the ammoniacal filtrate add 5 cc. of 10 per cent calcium chloride solution: a gelatinous precipitate forms; filter and wash with water; add 1 cc. of diluted nitric acid to the precipitate; wash with 2 cc. of water; to the dissolved precipitate add 0.5 cc. ammonium molybdate solution: a yellow coloration and a yellow precipitate forms on gentle warming (*phosphates*).

Treat 5 cc. of pentnucleotide with 5 cc. of a solution of brucine acetate (10 per cent): a white precipitate forms, becoming crystalline on standing. To 5 cc. of pentnucleotide add 5 cc. of sodium hydroxide solution (10 per cent): not more than a slight precipitate appears; add 0.1 cc. of 1 per cent copper sulphate solution: no violet nor purple coloration is produced (*biuret*); add 1 cc. of 1 per cent copper sulphate solution: no marked precipitate is produced (*gums*). To 5 cc. of pentnucleotide add 1 cc. of diluted hydrochloric acid and an equal volume of freshly prepared hydrogen sulphide water; treat according to U. S. P. test for heavy metals: no more color change is shown than when the mixture is treated with 1 cc. of diluted hydrochloric acid and an equal volume of water. To 5 cc. of pentnucleotide add several drops of silver nitrate solution (10 per cent): a white precipitate forms, which dissolves on shaking the mixture.

To 5 cc. of pentnucleotide add 10 cc. of lead acetate solution and 0.2 cc. of glacial acetic acid: a white precipitate forms. Agitate the mixture for one or two minutes and filter with suction; wash the precipitate well with water; suspend in 15 cc. of distilled water, and treat with excess hydrogen sulphide; stir well, and filter into a tared flat shallow weighing dish; evaporate nearly to dryness on the steam bath; add about 5 cc. of dehydrated alcohol, evaporate the alcohol, then dry in a vacuum desiccator over sulphuric acid to constant weight; dissolve the dried substance in 10 cc. of water; add one drop of phenolphthalein indicator solution and titrate with tenth normal sodium hydroxide solution: not more than 63.5 cc. nor less than 57.5 cc. of tenth normal sodium hydroxide is consumed per gram of dried substance. Evaporate a 5 cc. portion of pentnucleotide to dryness in a shallow dish over a steam bath; dry for twenty-four hours in a desiccator: not more than 0.45 Gm., nor less than 0.41 Gm. of solid residue results.

Committee on Foods

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED BY THE COMMITTEE ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOLLOWING ANY NECESSARY CORRECTIONS OF THE LABELS AND ADVERTISING TO CONFORM TO THE RULES AND REGULATIONS. THESE PRODUCTS ARE APPROVED FOR ADVERTISING IN THE PUBLICATIONS OF THE AMERICAN MEDICAL ASSOCIATION, AND FOR GENERAL PROMULGATION TO THE PUBLIC. THEY WILL BE INCLUDED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED BY THE AMERICAN MEDICAL ASSOCIATION.

RAYMOND HERTWIG, Secretary.

LIGHTNING FLOUR (BLEACHED)

Manufacturer.—Bob White Flour Mills, Kingfisher, Okla.

Description.—A "standard patent" "all purpose" hard wheat flour; bleached.

Manufacture.—Selected hard wheat is cleaned, scoured, tempered and milled by essentially the same procedures as described in THE JOURNAL, June 18, 1932, page 2210. Chosen flour streams are blended and bleached with a mixture of benzoyl peroxide and calcium phosphate (¼ ounce to 196 pounds of flour) and with nitrogen trichloride (⅛ ounce to 196 pounds of flour).

Analysis (submitted by manufacturer).—

	per cent
Moisture	13.0 –14.5
Ash	0.37– 0.44
Fat (ether extraction method)	0.8 – 1.2
Protein (N × 5.7)	10.0 –12.5
Crude fiber	0.3 – 0.5
Carbohydrates other than crude fiber (by difference)	75.5 –70.9

Calories.—3.5 per gram; 99 per ounce.

Claims of Manufacturer.—The flour is especially designed for commercial baking uses.

ROYAL TABLE QUEEN BREAD (SLICED)

Manufacturer.—Royal Baking Company, Ogden and Salt Lake City, Utah.

Description.—A white bread made by the sponge dough method (as described in THE JOURNAL, March 5, 1932, p. 817); prepared from patent flour, patent wheat flour, water, sucrose, dry skim milk, lard, yeast, salt, a partially hydrolyzed starch, a mixture of calcium acid phosphate and calcium peroxide and a yeast food containing calcium sulphate, ammonium chloride, sodium chloride and potassium bromate.

Analysis (submitted by manufacturer).—

	per cent
Moisture (entire loaf)	35.0
Ash	0.9
Fat	1.4
Protein (N × 6.25)	9.6
Crude fiber	0.3
Carbohydrates other than crude fiber (by difference)	52.8

Calories.—2.6 per gram; 74 per ounce.

Claims of Manufacturer.—Conforms to U. S. Department of Agriculture definition and standard for white bread.

MELLO-WHEAT BREAKFAST FOOD

The Heart of the Wheat

Packer.—The Quaker Maid Company, Inc., New York.

Distributor.—The Great Atlantic & Pacific Tea Company.

Description.—Hard wheat "flour middlings" or farina.

Manufacture.—Hard wheat farina of definite specifications is obtained from flour mills, mildly heated to destroy insect infestation and packed in cartons.

Analysis (submitted by manufacturer).—

	per cent
Moisture	12.2
Ash	0.4
Fat (ether extraction method)	1.2
Protein (N × 5.7)	9.8
Crude fiber	0.3
Carbohydrates other than crude fiber (by difference)	76.1

Calories.—3.5 per gram; 99 per ounce.

Claims of Manufacturer.—For use as a breakfast cereal or other table dishes; also for infant feeding under the directions of a physician.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, OCTOBER 1, 1932

INTESTINAL ABSORPTION OF FLUID

The mechanism by which fluids are absorbed from the lumen of the intestine has long been a subject of conjecture. Early in the century the late English physiologist E. H. Starling attempted to prove that such absorption is due to the osmotic pressure of the plasma colloids. This corresponds to the so-called *wasseranziehende kraft* of the early German students of the subject. Starling actually measured the osmotic pressure of the plasma proteins and found it to be of a magnitude sufficient to account for the diffusion of considerable water into the blood, as the capillaries are membranes through which the blood proteins—the blood colloids—do not readily pass. However, both he and other physiologists who had attempted to explain absorption of fluid on the basis of purely physicochemical hypotheses found difficulties that they could not surmount. Consequently they turned back to the old device of assuming the existence of some sort of "vital" absorbing forces believed to be characteristic of "living" membranes.

The osmotic theory of absorption, bereft of the vague "vital" features, seems destined at length to establish itself, notably through the researches of Wells [1] in the department of physiology at the Vanderbilt University School of Medicine, at Nashville, Tenn. He has actually measured with great care the osmotic pressure of the fluid in the intestinal lacteals; [2] likewise the absorbing force of the intestine. The latter seems to be fully accounted for, so far as fluid is concerned, by the colloids of the lacteals. This means that the osmotic pressure of the proteins in the intestinal lymph is adequate to determine the "inward transfer" of water under ordinary conditions. And since the tissue lymph is derived from the blood, in ultimate analysis the blood serum proteins are responsible for the phenomena of intestinal absorption under discussion.

1. Wells, H. S.: The Passage of Materials Through the Intestinal Wall: II. Am. J. Physiol. **101:** 434 (Aug.) 1932.
2. Wells, H. S.: The Concentration and Osmotic Pressure of the Proteins in Blood Serum and in Lymph from the Lacteals of Dogs, Am. J. Physiol. **101:** 421 (Aug.) 1932.

The process may be pictured somewhat as follows: The blood capillary wall is in truth somewhat permeable to protein. A fraction of the serum proteins finds its way into the fluids between the capillary walls and the epithelial wall of the intestine. Fluid is thereby absorbed into the lymph space. The lymph is continually moved on, so that the process is continued. The story does not end, however, with the passage of fluid through the epithelial wall. Ultimately the water must be eliminated somewhere, otherwise the subsequent dilution of the blood would slow down the process outlined. As Wells has clearly foreseen, so far as the amount and osmotic properties of the blood proteins and the condition of the capillary circulation in the villi remain unchanged, the potential of osmotic energy available for absorption of fluid can be maintained only by the elimination of water from the body. Hence Wells adds that the "vital force," the Maxwellian demon that has been evoked in the past to explain the intestinal absorption of fluid, is now "dispossessed from its residence in the enteric epithelium and exiled to other localities." And he concludes that "the final eviction of this pest rests, henceforth, on those who are engaged in the study of the mechanisms by which water is excreted."

THE ECONOMY OF MILK FORMATION

In the appraisal of the national food supply, a recent report [1] contains the following statements:

> To correspond to an optimal food supply, the national stock of provisions should contain a larger amount of milk. Presumably, there is a milk production of about 130 billion pounds, of which some 120 billion pounds come to human use; this, if equally distributed, represents a minimum of adequacy. The recent census will furnish better data on milk production. Equitable distribution of milk does not occur. This is due partly to the factor of supply, which, if it were larger, would simplify the problem of distribution and price. The old South suffers most from shortage of milk, but it is observed in other sections of the country as well. To a surprising extent, the diet of the farm population is deficient in milk. Sometimes this is owing to lack of cattle on the farms, but all too often milk, being an important cash crop, goes to market and the farm family does with little or without. To sell the butter fat and use the skim milk does not safeguard the diet. The country should aim not merely at a minimal sufficiency of milk but should seek the leeway of a generous supply.

In considering the economic aspects of securing the desired quota of our "most nearly perfect food," milk, attention is rarely directed to a biologic aspect of the subject; namely, the energetics of lactation. Dairy experts assert that "breed" is more significant than "feed" in securing abundant milk yields; yet it is recognized that the nature of the food intake can alter certain details of composition, notably the vitamin content of the mammary secretion. The milk dealer points to the cost of insuring the production of clean milk, of pasteurization, of distribution and of preservation of

1. Growth and Development of the Child, part III, Nutrition, New York, Century Company.

his output. Few persons stop to consider, however, that the milk-producing animal—and similarly the lactating mother—is a converter of energy. She ingests food and from it produces milk.

What returns, in terms of energy, does the milk formation represent? A similar question arises in relation to other animal foods. The beef cow transforms food fuel into edible meat; the hen produces flesh and eggs at the ultimate expense of food intake. These animals transform foods of plant origin into edible products. It has often been asserted, therefore, that economy demands, particularly in periods of stress, that we eat the vegetable nutrients—the cereals, tubers, roots, and edible leaves—directly, thus averting the necessity of the expensive biologic conversion of plant products into human use through the intermediation of the dairy cow, the beef cow, sheep, hens and other species.

A new estimate [2] of the economy of milk formation in cows has recently been published from the Institute of Animal Nutrition at the Pennsylvania State College. Holstein-Frisian cows, with an average live weight of 520 Kg. (1,146 pounds) and an average milk production, for one period of lactation, of 5,356 Kg. (11.808 pounds), transformed 20.96 per cent of their feed energy into milk energy during a period of lactation averaging 313 days in length and transformed 18.68 per cent of their feed energy into milk energy during a calendar year. The most efficient cow converted 23.35 per cent of her feed energy, and the least efficient cow 18 per cent of her feed energy, into milk energy during the period of lactation. This is somewhat better than the average efficiency of meat production. It indicates part of the price that is paid for the participation of the cow in the elaboration of our preferred food.

REVISING THE LIST OF TROPICAL DISEASES

The interest of former generations of American physicians in tropical disease was largely academic. The routine examinations of quarantine at ports of entry and the oceans on both sides of the country seemed to be sufficient protection from diseases considered peculiar to hot climates. Today it is becoming apparent that these ideas must be revised and that the tropics have other diseases against which our climate is not an adequate safeguard. Amebic dysentery, for example, has been removed from the category of tropical diseases; it is frequently found in the temperate zones. Last week THE JOURNAL published the report of another tropical disease present in the United States to an unexpected degree. The report of DeWolf and Van Cleve shows that lymphogranuloma inguinale cannot be regarded as foreign to our shores. Many cases were found in Cleveland, and a similar study in other large cities probably would reveal a similar situation. From a confusion of such names as tropical bubo, nonvenereal bubo, strumous bubo of the groin, subacute inguinal poradenitis, fourth venereal disease and nontuberculous granulomatous lymphadenitis, which this disease has been called, they select the name lymphogranuloma inguinale as indicating the character and location of the disease. This condition should not be confused with granuloma inguinale, which is a distinct disease of the skin and subcutaneous tissue in the neighborhood of the sex organs, whereas lymphogranuloma inguinale is a disease of the inguinal lymph glands.

While others have made the suggestion, DeWolf and Van Cleve are convinced that lymphogranuloma inguinale is a specific autonomous venereal disease. It always follows sexual exposure. The primary lesion usually is small and evanescent, disappearing without treatment only to be followed in from ten to thirty days by enlarged inguinal glands, which continue to grow until they may reach the size of a fist and fistulas have developed. An interesting part of this report is the method of diagnosis of cases of adenitis which previously were not understood. The simple intradermal injection of an antigen prepared from a suppurating gland produces an inflammatory papule in the skin. The Cleveland investigators applied this method of diagnosis (the Frei test) to 1,010 persons, and in 58 the test was definitely positive. Among these subjects were some in the active stage of the disease, some who gave a history of having had it many years ago, and others with anorectal disease, difficult to diagnose. The Frei test was made in seventy-five cases of chancroidal infection, with only two positive reactions; one patient remembered an attack of chronic inguinal adenitis eighteen years previously, and he had old scars in the groin; the other was considered to have mixed chancroidal and lymphogranuloma inguinale infection. In every one of eighty-four cases of early active syphilis the Frei test was negative. Among fifty-eight cases of gonorrhea, the test was negative in fifty-four; the four patients who had positive Frei reactions all gave a history of a previous chronic inguinal adenitis. There were twenty patients collected from the medical, surgical, tuberculosis and dermatologic services of the Cleveland City Hospital who had clear cut positive Frei reactions and all of them gave a history of persistent inguinal adenitis of unusual character.

The Frei test is specific; it is therefore a means of differentiating lymphogranuloma inguinale from chancroidal infection, syphilis, and other conditions about the sex organs. There is nothing to indicate that lymphogranuloma inguinale is more prevalent in Cleveland than in other centers of population in the United States. The discovery of these cases elsewhere offers a clear field for American investigators.

2. Forbes, E. B., and Voris, LeRoy: The Economy of Conversion of Food Energy into Milk Energy by the Dairy Cow, J. Nutrition 5: 395 (July) 1932.

Current Comment

CARING FOR THE VICTIMS OF AUTOMOBILE ACCIDENTS

The free service of physicians and hospitals has been considerably increased in recent years by the growing numbers of automobile casualties. The number of persons killed or injured in motor accidents seems hardly credible. In 1930 there were 33,000 deaths and over a million injuries from such accidents. In the decade from 1921 to 1930 the number killed was 230,353. It has frequently been said that, were such a volume of mortality and morbidity caused by some new disease, the whole country would be roused and its resources marshaled against the scourge. The economic losses resulting from these accidents are immeasurable. They fall on the victims' families, the physician, the hospital, and all who would normally profit by what the killed and injured would have produced and consumed had it not been for the accidents. The committee appointed by the Columbia University Council for Research in the Social Sciences to study compensation for automobile accidents has recently made its report of 313 fatal cases which it investigated. It states that in the insured cases payments in sufficient amount to meet the cost of medical care and of funerals were received in 77 per cent. In 11 per cent, such payments were insufficient to meet these costs and in 12 per cent there were no payments at all. Of the cases not covered by insurance, payments sufficient for medical and funeral costs were made in 7 per cent, insufficient payments in 8 per cent, and no payments at all in 85 per cent. In all the cases, fatal and otherwise, studied by the committee, payments sufficient to cover the equivalent of medical expenses were received in 6.6 per cent. As to the losses sustained by hospitals incidental to caring for the injured victims of automobile accidents, the committee made several inquiries. Fourteen Philadelphia hospitals furnished information concerning 688 cases. The treatment involved ranged from first aid to long periods of hospitalization. Free treatment was given to 429, or 62 per cent, of these patients. Charges amounting to $16,410 were made in 259 cases. Of this amount, one third remained unpaid at the end of one year following the dates of accidents. In 1929, nineteen New Jersey hospitals cared for 1,781 automobile accident patients, rendering service in the amount of 22,440 hospital days. Bills for this service totaled $106,089, of which amount 56 per cent, or $59,530, was collected. In 1930 the Ohio Hospital Association found that, of $810,489.14 in hospital bills for service rendered automobile accident patients, $406,761.24, or approximately 50 per cent, was considered uncollectable. As a result of its studies, the committee goes on record as favoring compulsory liability insurance on the part of automobile owners. One provision of its proposed law covers the treatment and care of injured persons. It provides that the costs of medical or surgical care, hospitalization, nursing service, medicines, necessary apparatus and the like shall be borne by the automobile owner responsible for the accident. The charges for such service shall be in keeping with those that prevail in the community in which it is rendered. The injured person would be permitted to choose his physician and hospital, and protection of the car owner or his insurance carrier against fraud and collusion would be provided. If feasible, such a plan would go far toward relieving physicians and hospitals of a burden which society has no right to demand that they bear. They would still be doing their bit in serving those persons for whose injuries the responsibility could not be fixed on the automobile owners involved in the accidents causing the injuries.

PERITONEAL CULTURES OF BACTERIA

Clinical failure of vaccines has led to increased interest in the possibility of preparing effective immunizing agents without the use of artificial culture mediums. One handicap to such preparation has been the difficulty of obtaining actively infectious microorganisms in sufficient numbers from infected animal tissues or body fluids. A promising method of increasing this yield is suggested by Drs. Zinsser and Castaneda,[1] of the Harvard University Medical School. These investigators grew bacteria in the peritoneal cavities of rats whose resistance was attenuated by x-rays. The rats were killed three or four days after intraperitoneal inoculation and the peritoneal cavities then washed out and gently scraped with saline solution containing 0.2 per cent formaldehyde. At times the turbidity of the washings simulated the bacterial concentration of artificial cultures. The Harvard investigators, however, warn against the evident dangers of this new technic. With highly virulent human infections (e. g., Rickettsia prowazeki), "this method of vaccine production should be undertaken only by immunes, since it is next to impossible to avoid eventual infection."

PATHOGENIC SUNSHINE VITAMIN

During certain seasons of the year, an excessive cabbage diet seems to lead to the production of goiter in rabbits. This suggests a possible goitrogenic factor in these plants, whose nature or amount varies with the intensity or length of exposure to sunlight, and laboratory research apparently confirms the logic of the conclusion. Webster[1] of Tulane exposed freshly harvested relatively nongoitrogenic cabbage leaves to a carbon arc and fed the irradiated leaves to normal rabbits. Control feedings were made with nonirradiated leaves from the same plants. At the end of two months the average thyroid weight of rabbits fed with the irradiated leaves was twice that of the control group. Whether or not a longer period of feeding would lead to an 8:1 thyroid hypertrophy by the end of 120 days and a 14:1 hypertrophy by the end of seven months, as in previous prolonged feedings with highly goitrogenic seasonal cabbage, was not tested. The data, however, seem adequate to prove that a pathogenic photodynamic process can take place in these plants. There is some evidence that the resulting goitrogenic toxin is a cyanogen compound.

1. Zinsser, Hans, and Castaneda, M. R.: Proc. Soc. Exper. Biol. & Med. **29**: 840 (April) 1932.
1. Webster, B. P.: Proc. Soc. Exper. Biol. & Med. **29**: 1070 (June) 1932.

Association News

MEDICAL BROADCAST FOR THE WEEK

American Medical Association Health Talks

The American Medical Association broadcasts on Monday and Wednesday from 10:45 to 10:50 a. m. over Station WBBM (770 kilocycles, or 389.4 meters). The Columbia chain program has been discontinued for the present.

The subjects for the week are as follows:

October 3. Committee on Foods.
October 5. Football Injuries.

There is also a fifteen minute talk sponsored by the Association on Saturday morning from 10:45 to 11 over Station WBBM.

The subject for the week is as follows:

October 8. What Is Prenatal Care?

This schedule is based on central standard time.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

CALIFORNIA

Personal.—T. D. Beckwith, Ph.D., has been appointed associate professor of bacteriology at the University of California, Los Angeles.——Dr. James A. Parker has been appointed health officer of Merced County, succeeding the late Dr. William C. Cotton, Atwater.

For Giving False Certificate to a Veteran.—Dr. John C. Arnout, Culver City, pleaded guilty recently to giving a false certificate to R. Bush, a war veteran, stating that he had examined Bush prior to 1925 and found him to be tuberculous. Dr. Arnout was placed on probation for a year.

Society News.—A symposium on pneumonia was conducted before the San Diego County Medical Society, September 13, by Drs. Howard A. Ball, Rudolph H. Sundberg, Lyell C. Kinney, James F. Churchill, William H. Barrow, Clair L. Stealy and Charles M. Fox.——A symposium on medical economics was presented by the Hollywood Academy of Medicine at its meeting, September 15, with the following speakers: Drs. Edwin O. Palmer, Carl R. Howson, John V. Barrow and Fred B. Clarke.——Dr. Williams McKim Marriott, St. Louis, conducted a children's clinic before the Alameda County Medical Association, September 19.

COLORADO

Society News.—Speakers before the Medical Society of the City and County of Denver, September 20, were Drs. Joseph E. A. Connell, "Severe Infection of the Hands"; Arnold Minnig, "Medical Management of Exophthalmic Goiter," and Chesmore Eastlake, "Spread of Rocky Mountain Spotted Fever."

State Medical Election.—Dr. Frank B. Stephenson, Denver, assumed his duties as president of the Colorado State Medical Society at the annual meeting in Estes Park, September 10. Dr. Gerald B. Webb, Colorado Springs, was named president-elect, and Mr. Harvey T. Sethman, Denver, reelected secretary. The next annual session of the society will be held in Colorado Springs in September, 1933.

Hospital News.—Drs. Gerald B. Webb, George Burton Gilbert and John A. Sevier recently announced that they are no longer associated with Cragmor Sanatorium, Colorado Springs. In the future their patients will be cared for by the Glockner, Methodist and St. Francis sanatoriums and nursing homes. Dr. Alexius M. Forster has assumed the direct medical supervision of Cragmor Sanatorium; Dr. James J. Barfield is the associate physician. Dr. Forster has been physician-in-chief of Cragmor since 1910.

Opposition to Further Construction of Veterans' Hospitals.—Six resolutions indicating the opposition of the Colorado State Medical Society to certain legislation affecting World War veterans were adopted at its annual meeting in Estes Park, September 18. Further construction of federal hospitals for any purpose whatsoever, treatment of any kind in branches of the veterans' bureau for disabilities other than those directly connected with military service, and disability allowances in the form of pensions to veterans suffering from diseases not incurred in active service are opposed. The society in the resolutions pledged itself to exert all proper measures to prevent "this unwarranted increase in our tax burden."

ILLINOIS

Society News.—Guest speakers who addressed the Logan County Medical Society, September 22, were Drs. James G. Carr, on "Prognosis of Coronary Diseases"; Bernard Fantus, "Therapy of Intestinal Stasis"; William R. Cubbins, "Injuries of the Knee Joint," and Carl A. Hedblom, "Surgical Treatment of Pulmonary Tuberculosis." The speakers were from Chicago.——Dr. Ivan E. Brouse, Jacksonville, read a paper on "Diverticula of the Alimentary Tract" before the Greene County Medical Society, September 9.——Dr. Arthur E. Williams, Rock Island, addressed the first fall meeting of the Rock Island County Medical Society, September 13, on "Maya Medicine."——Dr. Marion L. Klinefelter, St. Louis, addressed the Adams County Medical Society, September 12, on fractures.——Dr. Lena K. Sadler, Chicago, addressed the Carroll County Medical Society, Savanna, September 30, on "Mental Hygiene and Adolescence," and Dr. Clement L. Martin, Chicago, "Current Proctologic Problems of General Interest."——The Will-Grundy Counties Medical Society was addressed in Joliet, September 28, by Dr. William L. Brown, Chicago, on cancer.

Chicago

Dr. Bauer to Lecture.—A course of lectures and clinics will be given, October 3-12, at the Norwegian-American Hospital by Dr. Julius Bauer, professor of medicine, University of Vienna, Austria. His subjects include constitutional factors in disease, arterial hypertension, hyperthyroidism and hypothyroidism, obesity, so-called rheumatism, parenchymatous lesions of the liver, diseases of the pituitary gland, suprarenal syndromes and human genetics.

Goodwill Industries Moves.—The Goodwill Industries, a philanthropic organization that provides occupational training for the handicapped, moved, September 26, into its new headquarters, a building formerly occupied by the University of Illinois Medical School. In this building the Goodwill Industries plans to carry on a school for occupation therapy to work in connection with its shops for the handicapped and occupation service and the Cook County Hospital (THE JOURNAL, August 20, p. 660).

KENTUCKY

Grading Tourist Accommodations.—The Kentucky State Board of Health has adopted a metal sign bearing the word "Accredited," which will be issued to hotels, tourist camps and restaurants which meet the board's requirements. Certificates have been used heretofore, but as these have been of little service to tourists it was decided to provide the signs to be hung outside. They are to remain in the possession of an establishment only so long as it complies with requirements.

MAINE

Society News.—Drs. Robert M. Lewis, New Haven, Conn., and James D. Heard, Pittsburgh, addressed the Hancock County Medical Society, August 17, on obstetrics and on Galen and Harvey, respectively.——Dr. N. B. Foster, New York, addressed the Knox County Medical Society, Rockland, August 9, on albuminuria.——Clarence C. Little, Sc.D., director, Roscoe B. Jackson Memorial Laboratory, Bar Harbor, was the principal speaker at the annual meeting of the Maine Public Health Association at Lakewood in July, on control of cancer.

MARYLAND

Dr. Weinzirl Appointed Epidemiologist.—Dr. Adolph Weinzirl has been appointed epidemiologist of the Baltimore City Health Department, succeeding Dr. Valcoulon L. Ellicott, who resigned several months ago to become health officer of Montgomery County. Dr. Weinzirl recently completed a graduate course at Johns Hopkins School of Hygiene and Public Health. He was deputy commissioner of health of Seattle from July 1, 1926, to Sept. 15, 1931.

Communicable Diseases Reported.—An epidemic of typhoid has been reported in Vindex, a mining community in Garrett County. Twenty-four cases had been reported up to September 15, it was stated. School busses operating between

Wenona and the lower end of Deal Island and the Deal Island school are not permitted to pick up school children on account of the prevalence of diphtheria in the lower island village. One death has been reported with the development of six cases in one week.

Dr. Frobisher Returns to Johns Hopkins.—Martin Frobisher, Jr., Sc.D., New York, has been appointed associate in epidemiology at Johns Hopkins School of Hygiene and Public Health. He resigned as associate in pathology and bacteriology at Johns Hopkins in 1928 to join the Rockefeller Institute for Medical Research in New York. The last three years have been spent in Brazil, where he has been engaged in research on yellow fever for the International Health Division of the Rockefeller Foundation. Dr. Frobisher recently recovered from an attack of yellow fever.

MASSACHUSETTS

Clinic for Chronic Diseases.—The study and treatment of diabetes and other chronic diseases will be carried on in the George F. Baker Clinic, to be erected this fall at the New England Deaconess Hospital. Construction of the five story building has been made possible through a gift of $250,000 by George F. Baker, New York. It will be red brick with limestone base and trim and will contain forty-seven beds.

Four County Society Holds Annual Meeting. — The scientific program presented before the Four County Medical Society of Western Massachusetts at its annual meeting in Springfield, September 14, included the following papers: "Streptococcus Pneumonia and Some of Its Complications," Dr. Alfred E. Johnson, Jr., Greenfield; "Observations on Transurethral Resection of Prostate," Dr. Nathan Finkelstein, Pittsfield; "Surgical Tonsillectomy versus Electrocoagulation," Dr. Eugene G. Boss, Springfield; "A Case of Traumatic Rupture of Gallbladder," Dr. Patrick E. Gear, Holyoke; "Problems of the State Society," Dr. Halbert G. Stetson, Greenfield, president of the Massachusetts Medical Society, and "General Practitioner's Need for More Careful Analysis of Cases of Chronic Rheumatism," Dr. Robert B. Osgood, Boston. Dr. Edmund Eugene W. Walker, superintendent of the Springfield Hospital, where the meeting was held, gave an address of welcome. Dr. Jerome A. Whitney, Springfield, is secretary of the society.

MICHIGAN

Dr. Cannon to Give Beaumont Lectures.—Dr. Walter B. Cannon, George Higginson professor of physiology, Harvard University Medical School, Boston, will present the Beaumont Lectures of the Wayne County Medical Society, January 30-31. The subject tentatively selected is the relation of the autonomic system to the functions of the alimentary canal.

State Medical Election.—Dr. George L. Lefevre, Muskegon, was named president-elect of the Michigan State Medical Society at its annual meeting in Kalamazoo, September 13. Dr. J. Milton Robb, Detroit, is the incoming president. Dr. William A. Hyland, Grand Rapids, was appointed treasurer to succeed Dr. Aaron V. Wenger, Grand Rapids, resigned. Dr. Frederick C. Warnshuis, Grand Rapids, is secretary. The next annual meeting of the society will be held in Grand Rapids.

Eye Clinic in Iron County. — The Children's Fund of Michigan will establish an eye clinic in Iron County within the next few months, it was reported, September 2. All children in the schools will be examined and children of indigent parents will be furnished glasses free of charge. Other children will be recommended for treatment by their physicians. Arrangements have also been made by the fund, it was announced, to furnish some of the underprivileged and undernourished children with free milk in the course of an experiment which will be carried out for Columbia University, New York. Tablets containing vitamin D will be added to the milk, which will be supplied by Iron County dairies, and the incidence of dental decay in children who have received the vitamin will be compared with the incidence in ose who have not received the preparation. No attempt will be made to regulate the diet.

MINNESOTA

Society News.—Dr. Rasmus V. Williams, Rushford, was named president of the Southern Minnesota Medical Association, succeeding Dr. Charles C. Allen, Austin, at its recent annual meeting in Rochester. Other officers elected are Drs. Harold C. Habein, Rochester, and Walter H. Valentine, Tracy, vice presidents, and Monte C. Piper, Rochester, secretary.—— Dr. Melvin S. Henderson, Rochester, addressed the Clay-Becker Counties Medical Association, September 1, on tuberculosis of the joints, and Dr. Owen H. Wangensteen, Minneapolis, surgery in tuberculosis.

MISSOURI

Annual Fall Clinical Conference.—The tenth annual fall clinical conference of the Kansas City Southwest Clinical Society will be held at the President Hotel, Kansas City, October 3-8. Guest speakers will include:

Dr. Morris Fishbein, Chicago, editor of THE JOURNAL, "Food for Thought."
Dr. Francis Carter Wood, director, institute of cancer research, Columbia University, New York, "Diagnosis and Treatment of Cancer from the Layman's Point of View."
Dr. Barney Brooks, professor of surgery, Vanderbilt University School of Medicine, Nashville, Tenn., "Diagnosis and Treatment of Gallbladder Disease."
Dr. John H. Musser, professor of medicine, Tulane University of Louisiana School of Medicine, New Orleans, "Disorders Due to Nutritional Errors."
Dr. Vernon C. David, clinical professor of surgery, Rush Medical College, Chicago, "Diagnosis of Lesions of the Large Bowel."
Dr. James B. Herrick, professor emeritus of medicine, Rush Medical College, Chicago, "Common Errors in the Treatment of the Heart."
Dr. Donald C. Balfour, professor of surgery, Mayo Foundation Graduate School, University of Minnesota, "Benign and Malignant Lesions of the Stomach."
Dr. Joseph L. Baer, associate professor of obstetrics and gynecology, Rush Medical College, Chicago, "Cervix Uteri in Obstetrics and Gynecology."
Dr. Charles A. Bahn, professor of ophthalmology, Post-Graduate Department of Louisiana State University, New Orleans, "Eyes and Teeth."
Dr. Lewis J. Pollock, professor of nervous and mental diseases and chairman of the department, Northwestern University Medical School, Chicago, "Neurology in Relation to General Medicine."
Dr. Ralph A. Fenton, clinical professor and head of the department of otolaryngology, University of Oregon Medical School, Portland, "Headache in Nose, Throat and Ear Cases."
Dr. Frank P. Miller, Los Angeles, "Silicosis."

Special hospital clinics will be conducted in addition to round table luncheons and a symposium on tuberculosis. A smoker will be held Wednesday evening, October 5. The speakers will be Mr. James E. Nugent on "Law and Medicine," and Dr. Richard L. Sutton, Kansas City, "Big Game Hunting in Medicine." The Central States Pediatric Society will hold a two day session, October 7-8.

MONTANA

Hospital Celebrates Anniversary.—St. Patrick's Hospital, Missoula, recently observed the anniversary of its founding in 1873 by holding a program in honor of the children born at the institution. Records show that 2,215 babies have been born there since its establishment. Nearly 1,000 persons attended the celebration. An opportunity was given to parents to inspect the various departments of the hospital.

NEW YORK

Dr. Lewis Honored.—A new hall at the New York State School for the Blind, Batavia, is called Park Lewis Hall, in honor of Dr. Francis Park Lewis, Buffalo, president of the school since 1900. Lieut.-Gov. Herbert H. Lehman made the principal address at the dedication of the new building, September 22. Dr. Lewis is vice president of the National Society for the Prevention of Blindness and of the International Association for Prevention of Blindness, both of which he helped to found. In 1928 he received the Leslie Dana gold medal awarded by the national society for achievement in the prevention of blindness and conservation of vision.

Society Recommends Ban on Fireworks.—A resolution recommending a statewide ban on the sale of fireworks was presented at the annual conference of secretaries of county medical societies in Albany, September 13, by Dr. Earle E. J. Mack, secretary of the Onondaga County Medical Society, which recently led a movement to impose the ban in Syracuse. The conference recommended the resolution to the Medical Society of the State of New York. The Syracuse ordinance, forbidding the use and sale of fireworks in the city, was passed, July 19, after an unusually high percentage of accidents had been reported as a result of Fourth of July celebration (THE JOURNAL, August 27, p. 769). It was pointed out that municipal ordinances can be easily evaded by dealers who set up stands outside the city limits for the sale of the contraband fireworks.

New York City

University News. — New York Post-Graduate Medical School of Columbia University is offering to medical graduates a course in clinical psychiatry for the general practitioner beginning October 5 and continuing through June, 1933, under the direction of Dr. Philip R. Lehrman. Dr. Benjamin Goldberg, Chicago, addressed students at the school, September 6, on "The Building of a Tuberculosis Organization."

Training in Psychiatry.—Plans for a course of training in community relationships for psychiatrists attached to state institutions have been announced by the mental hygiene committee of the State Charities Aid Association in cooperation with the state commissioner of mental hygiene and the heads of the various state hospitals. Psychiatrists in charge of the extramural work of the hospitals are to come to New York in turn for eight weeks' observation of mental hygiene problems and resources as they occur in the community outside the institution. They will observe the work of outpatient clinics, the Institute for Child Guidance, juvenile courts and similar activities.

Personal.—Dr. Joseph Eastman Sheehan recently sailed for Istanbul, Turkey, at the invitation of the government, to establish a unit for treatment by plastic surgery of soldiers wounded in the World War.——Dr. Walter Béran Wolfe addressed the Vienna Society for Individual Psychology, August 29, on "The Problem of Homosexuality."——Dr. George J. J. Lawrence, Flushing, L. I., was elected state commander of the American Legion at the annual convention in Brooklyn.——Dr. Charles Norris resigned as chief medical examiner for New York, September 20. —— Drs. John Victor Donnet and Charles Gordon Heyd were decorated with the medal of the Legion of Honor of France at a ceremony at Vichy, September 21.—— Dr. Shirley W. Wynne, health commissioner of New York, celebrates, October 8, the twenty-fifth anniversary of his association with the city department of health. He was appointed assistant to the commissioner in 1920 after having spent thirteen years as medical inspector, assistant registrar and chief of the division of statistical research. He became deputy commissioner in 1926 and commissioner in 1928, succeeding Dr. Louis I. Harris.

PENNSYLVANIA

Typhoid in Beaver Falls.—Forty-three cases of typhoid recently occurred in the upper Beaver Valley district, including the towns of New Brighton and Beaver Falls. The beginning of the epidemic was traced to a contaminated spring, which was closed, August 22, after an investigation by the state board of health. Cases continued to develop until the middle of September, but it was believed that the situation was under control at that time.

Society News. — Dr. Samuel B. English, Glen Gardner, N. J., addressed the Northampton County Medical Society, Easton, September 16, on "Compression Therapy in Tuberculosis."——Dr. Mitchell P. Warmuth, Philadelphia, addressed the Bedford County Medical Society, Bedford, August 13, on gastric and duodenal ulcer.——A symposium on disease of the gallbladder was presented before the Lehigh County Medical Society, Allentown, September 13, by Drs. William Frederick Herbst, Frederick A. Fetherolf, John J. Wenner and William C. Troxell.

TENNESSEE

All-Day Meeting. — The Knox County Medical Society held an all-day meeting at the Hotel Andrew Johnson, Knoxville, September 20, with the following speakers:

Dr. William A. Frontz, Baltimore, "Hematuria with Special Reference to the Early Recognition of the Conditions Causing it."
Dr. James B. McElroy, Memphis, "Treatment of Anemias."
Dr. Robert S. Dinsmore, Jr., Cleveland, "Aspects of Thyroid Disease."
Dr. Edward Clay Mitchell, Memphis, "Allergy in Children with Special Reference to Asthma."
Dr. Robert H. Newman, Knoxville, "The Eye in Health and Disease."

Dr. Ralph H. Monger conducted a clinic on heart disease, and the visiting physicians were entertained at a banquet at which Dr. Ernest R. Zemp was toastmaster.

Society News.—Drs. Ervin P. Vaughan, Manchester, and Julius T. Conditt, Flat Creek, addressed a joint meeting of the Coffee and Bedford county medical societies, August 18, on tularemia and ileocolitis, respectively.——Dr. Thomas H. Phillips, Rockwood, read a paper on diverticulitis before the Roane County Medical Society, Harriman, August 16.—— Dr. Jefferson C. Pennington addressed the Nashville Academy of Medicine, September 13, on "Relief of Prostatic Obstruction by Transurethral Resection." Dr. James C. Overall addressed the academy, September 20, on "Allergic Diagnosis in Children." —— Dr. James R. McCord, Atlanta, addressed the Sullivan-Johnson County Medical Society in Bristol, September 7, on prenatal care, toxemias of pregnancy and chronic nephritis complicating pregnancy; he also addressed the Washington County Medical Society, Johnson City, September 8, on puerperal sepsis.——Drs. Barney Brooks and Horton R. Casparis, Nashville, discussed osteomyelitis and allergy, respectively, at a meeting of the Montgomery County Medical Society at Clarksville, August 29.

UTAH

Kavici's License Revoked. — The license of Dr. Franjo Kavici to practice medicine in Utah was recently revoked by the State of Utah Department of Registration on a charge of unprofessional conduct. It was said that he procured a fee on the assurance that a manifestly incurable diseased condition could be permanently cured. Kavici, who is known as Frank K. Belokossy, has appealed to the district court, according to the department of registration. He is a graduate of the University of Vienna and was registered in Utah, Aug. 12, 1931.

VERMONT

State Medical Meeting.—The one hundred and nineteenth annual meeting of the Vermont State Medical Society will be held, October 6-7, at the University of Vermont College of Medicine, Burlington, under the presidency of Dr. Edward J. Rogers, Pittsford. Speakers at the first session will be:

Dr. Charles Armstrong, U. S. Public Health Service, Washington, D. C., "Diagnosis of Mild Smallpox and of Scarlet Fever."
Dr. Richard B. Cattell, Boston, "Carcinoma of the Rectum."
Dr. Edward H. Cary, Dallas, Texas, "Ophthalmic Diagnosis."
Dr. Edward D. Churchill, Boston, "Nontuberculous Pulmonary Suppuration."
Dr. Donald S. King, Boston, "Tumors (Benign and Malignant) of the Lungs, Bronchi and Mediastinum."
Dr. Albert M. Cram, Bridgewater, "Diagnosis and Treatment of Trigeminal Neuralgia."

Dr. Rogers will deliver the presidential address Thursday on "Pneumothorax Treatment in Tuberculosis." Drs. Ivan Y. Patrick, James W. Duncan, Gerald C. Melhado and Herbert M. Little, all of Montreal, will conduct a symposium on obstetrics the second day. The annual banquet will be held Thursday evening, October 6, at the Ethan Allen Club.

WEST VIRGINIA

Society News.—Drs. Howard T. Phillips and William P. Sammons, Wheeling, addressed the Logan County Medical Society, Logan, August 19, on "Diagnosis and Treatment of the Prevalent Skin Diseases" and "Living Suture Material in the Repair of Hernia," respectively. —— Dr. Henry Kennon Dunham, Cincinnati, will address the Preston County Medical Society, October 6, on after-care of tuberculosis patients and responsibilities of the family physician. —— Dr. Jay Arthur Myers, Minneapolis, was the guest speaker at the eleventh annual meeting of the West Virginia Tuberculosis Association at Elkins, September 6, on "Tracing Tuberculosis to Its Source." Dr. Orra F. Covert, Moundsville, was reelected president.——The sixth annual meeting of the Hospital Association of West Virginia was held at Elkins, September 1.—— Dr. William J. MacDonald, Wellsburg, has resigned as health commissioner of Brooke County.

WISCONSIN

Society News.—Dr. Daniel T. Quigley, Omaha, addressed the Fond du Lac County Medical Society, August 30, on "The Use of Radium in the Treatment of Malignancy."——Drs. Edwin F. Schneiders, Madison, and Walter J. Jones, La Crosse, among others, addressed the Vernon County Medical Society, Hillsboro, August 10, on obstetrics and gynecology and on fractures, respectively.

State Medical Election. — Dr. Stanley J. Seeger, Milwaukee, was chosen president-elect of the State Medical Society of Wisconsin at the close of the annual meeting in Milwaukee, September 15. Dr. Reginald H. Jackson, Madison, was installed as president. The next annual session will be held in Milwaukee in conjunction with the annual session of the American Medical Association, June 12-16, 1933.

GENERAL

Examinations in Obstetrics and Gynecology.—The next written examination of the American Board of Obstetrics and Gynecology will be held, October 22, in nineteen cities of the United States and Canada. Special arrangements may be made through the secretary for taking the written examination in other cities than those specified where there is a diplomate of the board to conduct the examination. The next general oral and clinical examination will be held in Los Angeles, December 7, provided there are enough applicants. This examination will be in conjunction with the meeting of the Pacific Coast Society of Obstetrics and Gynecology. Lists close for group B applicants, October 5, and for group A applicants, November 15. Dr. Paul Titus, 1015 Highland Building, Pittsburgh, is secretary of the board.

Impostor in Surgeons' Room. — A Chicago physician reports that in July his pocketbook, containing various club membership cards, was stolen from his locker in the Passavant Memorial Hospital, Chicago, while he was performing an operation. Several persons reported that a strange man who said he was a physician had been seen in the dressing room. The surgeon received a telephone call, September 15, from French Lick, Ind., informing him that during the meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons there a man had registered in his name and had left the hotel without paying his bill. The hotel sent the following description of their delinquent patron, which is said to fit the man seen at Passavant Hospital in July: "The man who registered here was about 5 feet 8 inches in height, would weigh about 140 to 150 pounds, had gray hair, thin peaked face, ashen complexion, giving rise to the suspicion of his being a drug addict, a very nervous hand when registering, wore a light colored hat—the hat was almost white—was well supplied with identification cards."

A Spurious Medical Diploma.—A diploma from the Carnagey College of Medicine of San Francisco, presented in the recent trial of Paul Roger Zahlmann, licensed naturopath of West Haven, Conn., is believed to have revealed the existence of a new diploma mill. This college, according to the diploma, is chartered and incorporated under the laws of California. A search by the California State Board of Medical Examiners failed to reveal any record of it. Zahlmann was found guilty of violating the public health laws of Connecticut and was fined $100 on each of three counts, according to the state health commissioner of Connecticut. When first asked if he had attended the Carnagey school, Zahlmann begged to be excused. When pressed, however, he claimed he had attended the "college" in San Francisco from 1914 to 1916. He returned in 1923 and secured the diploma, he said. His memory was vague as to the date of his graduation, but finally he stated that he graduated in August, 1923. However, his diploma is dated Nov. 23, 1922. According to the California board, the first indication that spurious diplomas from this institution were in existence was in 1930 when the American Medical Association in a letter, December 18, requested information regarding the Carnagey College of Medicine. According to the California board, it is evident that all the signatures on the diploma are in the same handwriting. A search of the San Francisco directories for many years back failed to disclose any names similar to those signed to Zahlmann's diploma.

American Public Health Association. — The sixty-first annual meeting of the American Public Health Association will be held in Washington, D. C., October 24-27, with headquarters at the Willard Hotel. The preliminary program includes the following speakers:

Dr. Eugene L. Opie, Philadelphia, Childhood Tuberculosis.
Dr. Adolph S. Rumreich, Washington, D. C., Epidemiology of the Typhus-Spotted Fever Group in the Eastern Part of the United States.
Benjamin C. Gruenberg, Ph.D., New York, and Dr. Elliott S. A. Robinson, Boston, Principles of Motivation.
Dr. Leon C. Havens, Montgomery, Ala., Bacteriology of the Intestinal Pathogens.
Drs. Isadore Pilot and David J. Davis, Chicago, Rheumatic Diseases and Sore Throat with Reference to Hemolytic Streptococci.
Dr. Esther L. Richards, Baltimore, Mental Health of the School Child.
Dr. William A. White, Washington, D. C., Mental Health of the Adolescent.
Dr. William H. Park, New York, Toxoid versus Toxin-Antitoxin.

Sir Thomas Oliver, Newcastle-upon-Tyne, England, will deliver an address before the session on industrial hygiene. Symposiums will form a large part of the program of the association this year, including those on air hygiene; incidence, identification and significance of bacterial carriers; bacterial dissociation; participation of the medical profession in health education; syphilis as an industrial problem, and milks of special antirachitic value. Other organizations meeting at this time will be the American Association of School Physicians, International Society of Medical Health Officers, Conference of State Sanitary Engineers, State Laboratory Directors' Conference, Association of Women in Public Health and American Social Hygiene Association.

Society News.—Dr. Jennings C. Litzenberg, Minneapolis, was elected president of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons at its annual meeting in French Lick, Ind., recently. —— Dr. Henry C. Sweany, Chicago, was elected president of the Mississippi Valley Sanatorium Association at its recent annual meeting in Indianapolis. Other officers elected are Drs. Merlin H. Draper, Fort Wayne, Ind., vice president, and Arthur A. Pleyte, Milwaukee, secretary. The next annual session will be held in Kansas City, Mo., in September, 1933.——Dr. Albert F. Tyler, Omaha, was chosen president-elect of the American Congress of Physical Therapy at its meeting in New York, September 6-9. Dr. Gustav Kolischer, Chicago, was installed as president and Dr. Frederick B. Balmer, Chicago, was reelected secretary. The next annual session will be held in Chicago in September, 1933. Eight awards for distinguished contributions to physical therapy were presented to the following physicians: Drs. Arsene d'Arsonval, Paris; Francis Howard Humphris, London; Frederic De Kraft, New York; William L. Clark, Philadelphia; John Harvey Kellogg, Battle Creek, Mich.; Howard A. Kelly, Baltimore; Kolischer, and Tyler. The tokens were golden keys.——Dr. Everett D. Plass, Iowa City, Iowa, was named president-elect of the Central Association of Obstetricians and Gynecologists at the annual convention in Memphis, Tenn., September 16. Dr. Percy W. Toombs, Memphis, became president, succeeding Dr. Rudolph W. Holmes, Chicago. The association will meet in Milwaukee in 1933. —— Dr. Ernest S. Mariette, Oak Terrace, Minn., was elected president of the Mississippi Valley Conference on Tuberculosis at its recent annual meeting in Indianapolis.

FOREIGN

Harben Lectures.—Dr. Max Neisser, professor of bacteriology and hygiene, University of Frankfort-on-Main, Germany, will deliver the Harben lectures of the Royal Institute of Public Health, October 10-12, on "New Investigations Regarding Old Bacteriologic Problems." The first lecture will be on "Constancy, Variation and Transformation of Bacteria"; the second on "Tubercle-Like Acid-Fast Bacilli," and the third, on "The Bactericidal Effects of Silver."

Graduate Courses in Paris.—Prof. F. Rathery of the University of Paris Faculty of Medicine, with several of his colleagues, will give a special course on diabetes at the Clinique Thérapeutique Médicale de la Pitié, 83, Boulevard de l'Hôpital, Paris, October 13-29. The course will cover biologic study, methods of examination of patients, chemical study, complications and treatment. Practical demonstrations and presentation of patients will form part of the instruction. A course in cardiology will be given at the Hôpital Broussais, 96, Rue Didot, under the direction of Dr. Charles Laubry, October 10-22.

Courses in Vienna.—The University of Vienna announces a graduate course in pediatrics, to be given November 28-December 10 in the Children's Clinic under the direction of Dr. Franz Hamburger. As a part of the course, Dr. Hans Spitzy will give demonstrations of the orthopedic treatment of poliomyelitis at the Orthopedic Hospital, and Dr. Wilhelm Knoepfelmacher, of blood transfusions, at the Caroline Children's Hospital of the City of Vienna. The university is also arranging a course on diseases of the heart and lungs, to be given Feb. 13-26, 1933, and another on laryngology, otology and rhinology, to be given May 29-June 10, 1933.

Chinese Ophthalmological Society.—Twenty ophthalmologists recently met at the Peiping Union Medical College to organize the Chinese Ophthalmological Society. Dr. Hua-teh Pi was elected president; Dr. Pao-Hua Liu, vice president; Dr. Shih-pu Chang, Chinese secretary; Dr. Wen-ping Ling, English secretary, and Dr. F. H. Yao, treasurer. The membership will be chiefly Chinese but will be open to specialists in this branch of all nationalities. Meetings will be held on the third Friday of each month. At the first meeting of the society following its organization, the program included papers by Dr. Arnold Pillat on "Primary Glaucoma in North China," and Dr. Liu, "Normal Tension in Chinese Eyes."

Deaths in Other Countries

Sir Charters James Symonds, consulting surgeon to Guy's Hospital since 1912 and late consulting surgeon to His Majesty's Forces, in London, September 15, aged 80.——**Sir Henry Simson,** examiner in obstetrics, Conjoint Board of London and University of Leeds, author of articles on gynecologic subjects, in London, September 13, aged 60.

CORRECTION

The End-Results of Surgery in Exophthalmic Goiter. —In the article by Drs. Howard M. Clute and J. Ross Veal (The Journal, August 20, p. 642), the sentence beginning over table 5, in the second column on page 644, should read: If, however, the blood cholesterol is markedly elevated, it has been established that these patients with slightly low rates must be considered as having myxedema, . . . In other words, "blood cholesterol" should be substituted for "basal metabolic rate."

Foreign Letters

LONDON

(From Our Regular Correspondent)

Sept. 10, 1932.

The Advance of Surgery

The presidential address at the recent meeting of the British Medical Association has caused Lord Moynihan to return to a controversy which he started some time ago by saying that the craft of surgery had almost reached its limit, that "the full fruits of Lister's work have now been garnered," and that with operations now carried out on every organ in the body little further success can be expected. Commenting on this, Lord Dawson said in his presidental address: "Surely surgery has not reached so gloomy a finality. Listerism, which freed surgery from its chains, is surely a great permanent possession which conditions all progress but without determining the nature or limit of that progress." In reply, Lord Moynihan says that Lord Dawson has gravely misapprehended his "clear message carefully expressed" and does not seem to appreciate the distinction between "the craft of surgery" and "surgery." The craft is by no means the whole of surgery. The craft has almost reached the end of its progress; but surgery is a strong arm not only of therapy but of research. Here he sees no evidence of finality. Lord Moynihan points out that in 1873 Erichsen (the author of the leading treatise on surgery at that time) asserted that there were two schools of surgery in this country, the practical and the philosophical—the former resplendent with the names of the Heys, the Clines, the Coopers, Lister and Syme; the latter having as its founder and leader John Hunter and including Brodie and Paget. The former school was characterized by boldness in conception and rapidity, precision and simplicity in the performance of operations. In regard to the technical dexterity of the practical school, Erichsen saw finality and said that the art of surgery had "nearly if not quite reached the final limit," but he added that it was widely different with regard to the scientific school. Lord Moynihan agrees with Erichsen that the mere art of manipulative surgery has reached its limit and doubts whether we are today greater masters of manual skill than our predecessors. He points out that there is a limit to technical skill, not only in surgery but also in art. No finer technical work has ever been accomplished than that of artificers in the days of Tutankhamen; no greater sculptors have delighted mankind than those of ancient Greece. If stories can be believed, no finer manipulators in surgery have flourished than Liston and Ferguson, the Cramptons and the Coopers. Lord Moynihan concludes: "Surgery made perfect as a craft, not only in respect of technical skill but in respect also of safety, only then becomes a perfect instrument of research. Scientific surgeons think not of a 'gloomy finality' but only of a hopeful and confident beginning, which has already yielded no small result."

Serologic Tests on Different Races

In the Section of Anthropology of the British Association for the Advancement of Science, Professor Suk of Czechoslovakia reported his study of 3,000 precipitation tests and 4,000 blood groupings. On the basis of the precipitation tests, the biologic value of the different races was discussed. The serum from Eskimos, Kalmucks, Gipsies, European Jews and various Europeans—nordic, alpine, dinaric and others—was used. Fifteen antiserums and twenty-five serums were employed in dilutions up to 1 in 20,000. His conclusions were as follows: The different European "races"—nordic, alpine, dinaric are not true races at all but only types or races in process of making. Only distinct and geographically separated groups give well marked differences. Hence nordic, alpine and dinaric have not the immunologic specificity of the old races, such as Mongols and Negroes. The general result of the work on blood groups with regard to different anthropologic traits, such as the color of the eyes and the color of the hair, seemed to show that the racial significance of blood groups was small and had been grossly overrated.

The Cambridge Professor of Physic

Dr. W. Langdon Brown has been appointed regius professor of physic in the University of Cambridge in succession to Sir Humphry Rolleston. Dr. Langdon Brown is the oldest son of the late Dr. John Brown, minister of Bunyan Meeting Bedford, the biographer of Bunyan. He was educated at Cambridge and St. Bartholomew's Hospital, of which he is consulting physician. He is well known for his lucidity as a teacher and writer, who has best demonstrated the connections of modern physiology with practical medicine. This is well shown in his popular "Physiological Principles in Treatment," which has reached its sixth edition. Other works from his pen are the "Sympathetic Nervous System in Disease," "The Endocrines in General Medicine" and "Trench Nephritis." He is a brilliant writer, who illuminates his exposition by philosophical flashes.

Speed in Flight

In a lecture delivered in connection with the meeting of the British Association for the Advancement of Science, Mr. H. E. Wimperis referred to the speed of 407 miles an hour attained by Lieutenant Stainforth of the royal air force. When an airplane flew in a circular path, the centrifugal force was balanced by increased lift on the airplane's wings, while the centrifugal force on the pilot's body was balanced by the greater reaction exerted by the floor or his seat. His body appeared to him to weigh much more than usual, and he might find it almost impossible to lift his arms. What was still more embarrassing was that, owing to his blood weighing many times the normal it might gradually leave his brain in favor of a lower and more distensible part of his body. The immediate effect was loss of sight, which fortunately was only temporary. This was so common a feature in the fast flying of today that it was familiarly known as "blacking out." Pilots stated that it was not accompanied by any loss of mental clarity, and that control, of course, could still be maintained.

PARIS

(From Our Regular Correspondent)

Aug. 24, 1932.

The Radiologic Exploration of the Appendix

Many attempts have been made to ascertain the condition of the appendix by means of radiography. Irrespective of the method employed, the results are generally uncertain. Many surgeons and radiologists regard the method as much inferior to a study of the clinical signs long since established. Messieurs Kadrnka and R. Sarasin have an article in the *Presse médicale*, illustrated with roentgenograms, which appears to denote considerable progress in the study of this problem. They point out that formerly in a third of the cases the appendix remained invisible in the roentgenogram, since the barium paste does not easily penetrate the small opening that connects the appendix with the cecum, owing to congenital stenosis of that orifice, or because of the presence of parasites, foreign bodies or fecal matter in the appendix. This explains the discrepancies in the figures that one finds in the literature. Some authors have improved their results by administering, along with the barium paste, stimulants of intestinal contraction. The opaque lavage, even though administered under heavy pressure, does not yield better results and is often dangerous, and there is a chance that the opacity of the distended cecum may simulate the light shadow of the appendix. The peculiar technic of Kadrnka and Sarasin is as follows: They first give the patient castor oil and then apply a lavage of the large intestine with water. Thereupon an enema of barium paste is given with the patient in the Trendelenburg position,

the distention of the cecum, which must be very moderate, being controlled under the fluoroscope. The patient is then permitted to evacuate naturally the opaque enema, after which air is injected into the cecum, the operation being constantly controlled under the fluoroscope. This method has been applied by them in ninety cases in which pain in the region of the appendix was complained of. The appendix was thus brought into view with its peculiar dispositions, position or abnormal dimensions, cicatricial adhesions, and the like, in sixty-six cases. When the result was negative, the operation was repeated, a barium paste, to which magnesium sulphate was added, being ingested by mouth, a method which diminishes the percentage of failures. But the procedure of the authors, when it is successful, gives interesting results, since the image of the cecum is represented not by a massive opaque spot but by the outline of the thin layer of barium that remains adherent to the cecal mucosa after the evacuation of the enema and the injection of air. The appendix is frankly visible. Nonvisibility of the appendix, when this technic is employed, justifies the observer in suspecting the existence of important lesions. Of twenty-four cases presenting an invisible appendix, a surgical operation was performed in sixteen and all sixteen cases showed grave lesions.

The Stimulative Action of Extracts of Tubercle Bacilli

The rôle of fatty and waxlike substances that form an envelop about tubercle bacilli, which may be dissolved by means of acetone, has been interpreted in different ways. In the preparation of tuberculin and of various extracts of tubercle bacilli, one gets rid of these substances at the start, for technical reasons. In reality, these substances constitute a menace, as they possess a stimulative action on the development of tubercle bacilli. They facilitate the passage of the invisible and filtrable type of the bacillus, such as traverses the placenta of the infected mother in the bacillary and acid-resisting adult form. These facts were brought out in two articles presented at the same session of the Société de biologie, by Messieurs L. Nègre, J. Valtis and F. Van Deise, who gave the first presentation, and Mr. J. Beerens, who gave the second. The first speakers showed that subcutaneous injections of acetone extract of tubercle bacilli, given twice a week for two or three months after birth, may cause glandular lesions and abscesses containing tubercle bacilli to appear in young guinea-pigs sprung from tuberculous mothers. But it is only after their third passage through the guinea-pig that these tubercle bacilli become easily cultivable and begin to produce lesions that are generalized in the organs. Guinea-pigs the offspring of tuberculous mothers but not treated thus, and healthy guinea-pigs that had received the same injections of acetone extract of tubercle bacilli were not affected. The appearance of the lesion noted appears therefore to be due to the stimulative influence exerted by the fatty and waxlike substances enveloping the tubercle bacilli on the filtrable elements through the placenta.

Mr. Beerens made his investigations independently of the previous speakers. He gave repeated injections of acetone extract of tubercle bacilli to guinea-pigs inoculated with products (blood, pleural fluid) from tuberculous patients or with filtrates of these products. He showed that it is possible, under these conditions, to provoke the appearance in these animals of lesions containing characteristic tubercle bacilli, while the implantation of the same products in a highly sensitive medium, such as that of Löwenstein, and their inoculation without the acetone extract, remained negative.

Opposition to Compulsory Notification of Tuberculosis

Mr. Justin Godart, the new minister of public health, has given interviews to the press in which he outlined an extensive program that he plans to introduce. This is a common practice of ministers soon after their election. When later they resign from office, in some political crisis, one is usually able to note an enormous discrepancy between the projects announced and the progress realized. The projects promised always include everything that is desirable and everything that the official's predecessors were unable to accomplish, but they often do not take account of the conditions that prevented their realization. The same applies to the plans of Mr. Justin Godart. He announced that he was going to issue a decree that would make compulsory the notification of tuberculosis. The medical syndicates, however, have opposed for twenty years the imposition of such an obligation on the physician. Notification is followed legally by measures of disinfection, isolation and administrative control, which are willingly accepted by the families of patients with diseases of short duration, such as diphtheria and scarlet fever. But they oppose notification of a disease of long duration, such as tuberculosis, which is not contagious except in certain clinical forms. These measures, when applied, put the patient in a suspicious position before his neighbors, who through fear of contagion often compel the house owner to cancel the lease of the patient's family. The Academy of Medicine itself, when consulted on several occasions by the successive ministers of health, has never been able to obtain a majority in favor of making compulsory the notification of tuberculosis. However, it did finally adopt a resolution to the effect that compulsory notification should rest on the head of the family when the attending physician has pronounced a diagnosis of open and contagious tuberculosis. But no penalty is imposed on him who prefers not to fulfil this formality, nor on the physician who advised him to make the notification. In actual practice, however, measures of isolation within the family and of prophylactic disinfection are always carried out when a physician calls attention to the need of such precautions, and the physician can order the patient removed to a hospital in case such precautions are not feasible. That is all accomplished without forceful intervention on the part of the municipal administration. Hence, when the new minister of public health announced that he was going to make compulsory the notification of all forms of tuberculosis by the attending physician, he aroused the opposition of the medical syndicates, who declared that they would not submit to such a decree if promulgated. Doubtless the minister will have to suppress this generous impulse as he has others that have been regarded as attacks on the independence of the medical profession.

Aviation Among Physicians

The increasing use of airplanes for the transportation of the wounded has developed in many French physicians a taste for aviation. Sanitary aviation originated in France shortly before the war, under the influence of Mr. Nemirowsky. During the war, no use was made of it because of the nearness of the enemy lines and the dangers associated with encounters between army planes. But during the campaigns in Syria and Morocco, the transportation of the wounded by airplane rendered excellent service, and airplanes are still of great service in Morocco because of the poor roads in the area not yet pacified. A society called Friends of Sanitary Aviation has been founded, in which surgeons and professors (Mr. Charles Richet, for example) are taking an active part. This society organized in Paris the first International Congress of Sanitary Aviation, at which six nations were represented. There are today a number of physicians and surgeons who use the airplane as their preferred mode of transportation. Prof. Pasteur Valléry-Radot, when going some distance from Paris, transports his assistants in his own plane. Dr. Crochet, on the occasion of the Congress of Surgery, held recently at Madrid, made the journey by plane, which he piloted himself, and on his return he included Morocco, Algeria, Tunisia and Syria in his itinerary, visiting many of the stations on this route. In three months he covered nearly 8,000 miles. On returning to Paris, he was enthusiastically received at the Orly aerodrome (near Paris) by the army aviators stationed there. The min-

ister of aviation sent a representative to extend to him official congratulations. It was said that his plane and the motors had been so well cared for by himself during this long journey that they still looked as if they had just come from the factory.

BERLIN

(From Our Regular Correspondent)

Aug. 22, 1932.

Radiologic Treatment in Otorhinolaryngology

At this year's session of the Kongress der Gesellschaft Deutscher Hals-Nasen-Ohrenärzte, one of the chief topics, as discussed by Holthusen, Hegener and Englmann, respectively, was "Radiologic Treatment in Otorhinolaryngology." Holthusen of Hamburg discussed the purely radiologic side, the development and systematic organization of radiologic therapy, and emphasized, as the chief task of roentgen and radium treatment, the application of a definite minimum dose, destructive of the tumor. Clinical observation has shown that the action of radium therapy extends further than that of roentgen therapy, which is due to the fact that the doses of radium, in both superficial and intracorporal treatment, are usually several times heavier than the doses applied with roentgen rays. The action of roentgen rays can, however, be made to resemble that of radium if protracted roentgen irradiation is applied, as has been recommended by both Régaud and Coutard in the form of fractioned irradiation over a long period of time with heavy total doses, in which action the increased tension and the hardness play a part. Holthusen terms this kind of irradiation *langzeitbestrahlung* (long-time or protracted irradiation) as compared with the short-time irradiation formerly in vogue. The important thing is the knowledge that, when the time for the application of the dose is lengthened, also the quality of the reaction is changed. The range of capacity of radium as compared with roentgen rays is greater because with radium one has a better chance to concentrate the rays in one spot. On the other hand, it is more difficult to distribute the action of radium evenly over a large area, and herein the roentgen rays are superior. In other words, radium rays and roentgen rays are, in principle, of equal value. A superiority of radium results from the time conditions of the ray application and the enhanced opportunity for the local concentration of the rays. The value of roentgen rays is limited by the fact of the too slight radiosensitiveness of the tumors. The value of radium is limited by the fact that it is technically impossible to apply it evenly throughout the whole body area involved.

Hegener of Hamburg emphasized in his paper the importance of an exact special diagnosis that makes use of all the aids of our highly developed research. Microscopic examination of pieces of tissue from the tumor is absolutely necessary, since the histologic nature of the tumor determines in many cases the radiologic dosage, but great care must be taken to avoid exposing a benign tumor or a tuberculous papilloma to protracted irradiation or a prolonged application of radium. In twenty-six cases of malignant tumors of the hypopharynx, all of which presented a bad prognosis, thirteen were free from symptoms after six months, while two patients found their symptoms at least improved and were feeling well. Four patients showed no symptoms over a period of eighteen months and there was no primary mortality, whereas surgical treatment in the still operable cases of carcinoma of the hypopharynx gave a primary mortality of from 22 to 40 per cent. In all cases of tumor of the hypopharynx, protracted roentgen irradiation is the preferred method of treatment. In thirty-four cases of malignant tumor of the interior of the larynx, in some of which window resection and the Seiffert-Halberstädter radium needle method were employed, while in others protracted roentgen irradiation was applied, the success was striking, there being no primary deaths. Surgical thyrotomy gave good enduring results in sharply demarcated tumors, but in tumors not sharply demarcated failure was certain, and then a mutilating operation became necessary. Protracted irradiation has the great advantage that there is no mutilation and that complete recovery is possible. In twenty-nine cases of malignant tumors of the mesopharynx and of the tonsils, only one of which was operable, with extensive involvement of the glands, Hegener applied radium needles within the tumor together with protracted roentgen irradiation. In nine malignant tumors of the epipharynx, some of which appeared hopeless and not surgically operable, Hegener secured in three cases complete freedom from symptoms over periods ranging from fifteen to eighteen months. In eleven malignant tumors of the upper jaw and the nasal cavities, it was found that protracted irradiation alone does not accomplish much in such tumors, and that the best method is electro-endothermy, with preliminary irradiation and postirradiation.

K. Englmann of Hamburg discussed the effects of roentgen and radium rays on the tumor cells, their action on the bed of the tumor, and the differences in radiosensitiveness in carcinomas and sarcomas. In the carcinomas, under the application of a definite dosage, the basal-cell cancers are the first to become free from symptoms primarily and locally, being followed, after increase of the dosage, by cases of squamous-cell epitheliomas and then by chancroid. The focal doses for the basal-cell carcinoma range between 3,500 and 4,000 r; for the squamous-cell epithelioma and chancroid, between 4,000 and 4,500 r, in protracted roentgen irradiation. The doses given for roentgen irradiation presuppose the application of protracted and fractioned irradiation over periods ranging between sixteen and thirty days, or, in the case of radium, a continuous prolonged irradiation for from three to five days. But even with a focal dose of 4,500 r, squamous-cell epitheliomas of the buccal mucosa or of the tongue and floor of the mouth cannot be made to retrogress completely with roentgen rays alone, whereas these carcinomas can be cured with radium needles relatively easily. One must not, however, assume any superiority of radium rays as against roentgen rays and attempt to explain such superiority as due to the shorter wavelength of the gamma rays. According to the photometric method of Holthusen and Hamann, the radium dosage applied in these cases amounts to from 7,000 to 8,000 r, whereas the number of r units in the protracted roentgen irradiation is much less. One cannot speak of a constant carcinoma dosage, as one must consider the size of the tumor and its seat. Tumors that are localized in the skin are more favorable than tumors growing and infiltrating into the deeper tissues.

Seiffert of Kiel emphasized in his paper that, in applying radium inlays in treating carcinoma of the larynx, he protects the skin against the radium by inserting ivory or cork shields. He has operated in many cases on the irradiated region with good results, having performed partial and total resections, and in several cases healing by first intention was observed.

The discussion of these papers, by experienced men, revealed that these methods have not yet been accepted everywhere, and not even in all the large clinics, and that wider observation is needed before a final judgment can be reached. The Zurich radiologist Schinz emphasized that in German circles radiologic treatment has not yet found the appreciation that it deserves. In a total of 116 cases in which the protracted, fractioned roentgen irradiation could be carried out, forty patients became free from symptoms; in addition there were fourteen symptom-free patients who died from an intercurrent disease, and ten patients who were locally and regionally free from symptoms but died from distant metastases.

Cancer Mortality

Addressing recently the Berliner Medizinische Gesellschaft, Privatdozent Karl Freudenberg reported on the actual figures of cancer mortality. He said that it is not admissible to compare the number of persons who die of cancer with the total number of deaths but that the cancer deaths must be compared

with the corresponding figures of the living, in which connection the differences in the structure of the age groups must be considered. As the relation of cancer mortality to the mortality from senile debility plainly shows, low figures for cancer mortality are due solely to the fact that in such cases the diagnoses were less complete. It may be assumed that about one fifth of all cases of alleged senile debility should be classed under cancer. The number of cancer deaths in Germany, which for 1929 were estimated to be around 75,000, reached doubtless in reality about 95,000. Differences in the real cancer mortality rates for the populations of whole countries or for given periods cannot be established with any great degree of accuracy.

TURKEY

(From Our Regular Correspondent)

Ankara, Aug. 25, 1932.

Trachoma Campaign Regulations

Trachoma has decreased in recent years, but it is still widespread in the rural population of southeast Anatolia and the trachoma campaign is to continue with undiminished force. In compliance with the public health law, trachoma campaign regulations were issued, January 7. The most important part reads as follows:

Trachoma dispensaries, to which are attached trachoma hospitals with a minimum of ten, a maximum of fifty beds and an itinerant staff for the treatment of trachoma in rural communities, are to be organized in centrally located cities and towns of trachoma infested areas indicated by the ministry of health and social assistance. Every dispensary is to have a specialist physician, sanitary inspectors, a secretary and if necessary an assistant physician. The itinerant staff is to consist of four sanitary inspectors working under the direction of a physician. The itinerant staff is to engage in work among the rural communities surrounding the city where the trachoma dispensary is located. Itinerant staffs using tents are permitted the use of additional personnel. The trachoma dispensaries, hospitals and itinerant divisions are under the jurisdiction of a trachoma campaign director and form a trachoma district. As the dispensaries increase, new campaign districts comprising at least five dispensaries shall be formed. Itinerant sanitary inspectors, remunerated accordingly, shall have procured within one month, at the latest, an animal for their transportation. The director of a trachoma campaign is to be chosen from among specialist physicians of experience and of managerial ability. If enough qualified physicians are not available, they are to be appointed from among physicians who have successfully completed a trachoma campaign course at one of the campaign institutions indicated by the ministry of health. While taking the course, such physicians are to receive the salary of an itinerant physician. This salary shall be refunded if the candidate fails in the examination, if at the end of the course he refuses to go to the locality indicated, if he resigns, or if he had to be dismissed before having completed one year of service. The theoretical and practical instruction of such a course is to be in accordance with the program the ministry of health has laid down. Sanitary inspectors to be employed in trachoma campaign work shall be graduates of a school for sanitary inspectors. The dispensary physicians shall start the campaign with examinations in schools and all kinds of institutions and insure the treatment of those suffering from trachoma. School children affected with trachoma shall be isolated and taught in a separate building. Trachomatous inmates of penitentiaries shall likewise be isolated when the disorder is in the acute stage. Schools shall be visited frequently; new admissions must first be seen by the trachoma physician. Food selling, preparing or distributing agencies, persons employed in hotels, restaurants, bath houses and coffee houses, and all street venders of foods shall be examined frequently and those found with trachoma in the acute stage shall be prohibited from following their trade until successfully treated. Proprietors or leaseholders of factories, hotels, restaurants, bath houses and coffee or tea houses are obliged to notify at once the trachoma campaign dispensary and send for examination and treatment any employee with even the slightest eye trouble. The same applies to directors of schools in regard to teachers, students or employees and the heads of families in regard to all members of the household. The names of persons with trachoma shall be entered in the trachoma book and receive a trachoma record card on which the treatment applied is entered. In cities, general examinations shall take place at least once a year.

Itinerant physicians shall examine and treat the rural population. If during part of the winter the villages are inaccessible, the physician shall give his time to the dispensary. From forty to eighty villages shall form an itinerant campaign division. From ten to thirty villages shall form a subdivision with one sanitary inspector; to register the names of all village inhabitants shall be his first duty. The physician shall without exception examine all inhabitants. Reexamination of all inhabitants shall be carried out twice a year, in spring and autumn. The dispensary physician shall at least twice visit all villages within his district during the interval between each of the two general examinations. Itinerant physicians shall leave their headquarters on the third of each month, return on the twelfth, spend five days at headquarters filing records and examining those of sanitary inspectors, preparing reports and the like, and return to the villages on the eighteenth and to headquarters again on the thirty-first. Itinerant physicians shall receive two standard chests containing medicaments and other equipment. Only small surgical interventions may be performed at the villages; persons in need of an operation are to be taken to the dispensary. All treatments shall be entered in the treatment book. Treatments performed by the physician shall be checked red. Until the end of the month, the sanitary inspector shall make the rounds in the villages and apply the treatments the physician has ordered.

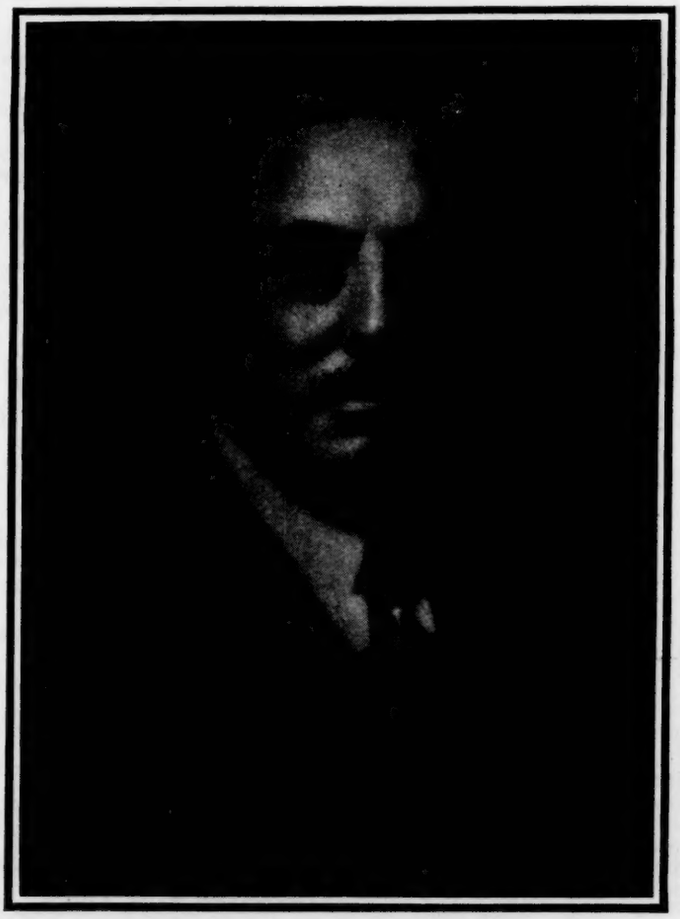
The itinerant sanitary inspectors shall be given a saddlebag wherein to transport his medicine chest and records. The sanitary inspector's chest shall contain (1) three bottles of 100 Gm. each of a 5 per cent solution of mild silver protein; (2) a 100 Gm. bottle of 1 per cent solution of zinc oxide and tutocain, 1 per cent; (3) a bottle of fifty tablets of oxide of mercury; (4) ten tubes of 10 Gm. each of antiseptic ointment composed of 0.2 iodoform, 0.3 cocaine and 10 Gm. of petrolatum; (5) ten tubes of 10 Gm. each of yellow ointment composed of yellow mercuric oxide, 0.1 Gm., and petrolatum, 10 Gm.; (6) ten tubes of 10 Gm. each of blue ointment composed of methylthionine chloride, 0.03, cocaine 0.2, and petrolatum, 10 Gm.; (7) two bottles of 100 Gm. each of silver nitrate solution composed of cupric sulphide, 0.25, cocaine, 0.3, distilled water, 5 Gm., and glycerin, 5 Gm.; (8) three alum pencils in glass tubes, three packages of ten eye bandages, a number of eye pads, 300 Gm. of cotton, two basins, two smooth towels, soap in a closed container, and a white gown. The chest shall contain no medicaments other than the eight mentioned. All ambulant and hospital treatments, including operations, are free of charge; it is prohibited that any fee or present whatever be accepted. It is prohibited that physicians in the service of a trachoma campaign open consultation rooms for the treatment of private patients, or that itinerant physicians accept fees for the treatment of patients of any kind or for medicaments. The salary shall be withheld of physicians disregarding these regulations; in case of repetition, the offender shall be dismissed.

Campaign physicians and sanitary inspectors shall enlighten the public on the subject of trachoma; they shall especially in schools give conferences to school teachers. The trachoma campaign director shall decide on propaganda activities which permit of the participation of the campaign officials.

Deaths

Dr. Frank Billings ⊕ builder of medical institutions and organizations, died at his home in Chicago, September 20, following a sudden severe gastric hemorrhage. He was born on a farm near Highland, Iowa County, Wisconsin, April 2, 1854. After two years of attendance at the State Normal School in Platteville, Wisconsin, he taught in the district school and became head of the high school in a neighboring village. In 1878 he matriculated at the Chicago Medical College, graduating in 1881 and winning first place in the competitive examination for internship in the Cook County Hospital. Following his internship he became demonstrator in anatomy in his alma mater, holding this position until 1885. During this period he led the campaign which won for medical schools in Illinois the right to dissection of the bodies of unclaimed pauper dead. From 1881 until the death of Christian Fenger in 1902, Dr. Billings was closely associated with this great teacher. In 1885 Dr. Billings went abroad for some fifteen months of study. The period was the beginning of scientific study of bacteriology. On his return to Chicago he demonstrated and practiced the technic he had learned for determination of the discovery of tubercle bacilli in the sputum. Also in 1887, at a meeting of the American Medical Association, he demonstrated, in the medical section, the known pathogenic bacteria.

From 1886 to 1891 Dr. Billings was professor of physical diagnosis in the Northwestern University Medical School, and from that time until 1898 professor of medicine. Then because of a difference of opinion with Henry Wade Rogers, president of Northwestern University, relative to medical education in that university, Dr. Billings transferred to Rush Medical College, becoming associate professor of medicine and dean of senior students. Now at the request of President William Rainey Harper, founder of the University of Chicago, Dr. Billings was made professor of medicine and dean of the faculty. The record of his association with Rush Medical College is an inspiring account of constant devotion, self sacrifice, financial aid, and persistent striving toward higher ideals and great accomplishments. Associated with the growth of the college has been the development of the Presbyterian Hospital as a teaching institution, with more than 600 beds. Here in the wards Dr. Billings taught students, interns, nurses, clinical clerks, and the members of the medical staff. Today well-nigh a hundred physicians adore his memory as that of a medical godfather; a Billings Club holds regular meetings in recognition of its devotion to a great master.



FRANK BILLINGS, M.D., 1854-1932

Early in his career, Billings developed an active interest in organized medicine. Nine years after his graduation he became president of the Chicago Medical Society. At the meeting of the American Medical Association in Columbus in 1899, he was chairman of the medical section and introduced the plan to print in the program abstracts of the papers to be read. In 1902 at the meeting in Saratoga he read a paper on the relation of medicine to commerce. At this session he was elected president and was told that the oration was the chief factor in securing that honor. Owing to a change in the system of elections, he served two terms and was the only physician who was President of the Association for two years. The completion of his term as President did not, however, indicate a lapse of interest. It was followed by intensified service. He was treasurer of the Association from 1904 until 1911, and trustee from 1918 to 1924. As secretary of the Board of Trustees he maintained immediate contact with the headquarters office and aided in the initiation and development of numerous significant activities.

On two occasions, addresses given by Billings before the Association had far reaching results. His presidential address, prepared with the help of Dr. George H. Simmons, concerned medical education. He condemned proprietary medical schools unreservedly and outlined what he believed should be the program of the Association in elevating the standards of medical education. As a result, the Board of Trustees created the Council on Medical Education and Hospitals, which has been of the greatest importance in bringing medical education in the United States to its present high status. Again at a meeting of the Association in Portland in 1905, Dr. Billings read a paper calling attention to the low standards of pharmaceutic advertising in most of the medical publications of the country. This was the opening gun in the work of the Council on Pharmacy and Chemistry, just established. Indeed, it may be said with certainty that no other man except Dr. George H. Simmons did more than Frank Billings in developing the American Medical Association to the position it occupies today in medical affairs.

In the building of both local and national medical organizations devoted primarily to the advancement of medical knowledge, Dr. Billings also had a leading rôle. In fact, his position in every activity with which he became associated was that of a leader. In the development of the Chicago Pathological Society, the Chicago Neurological Society, the Chicago Society of Internal Medicine and the Institute of Medicine of Chicago, he was prominent. He was president in 1906 of the Association of American Physicians and president in 1907 of the National Association for the Study and Prevention of Tuberculosis.

In every campaign for civic improvement in Chicago, Cook County and the state of Illinois, Dr. Billings likewise took significant action. He became chairman of a committee to investigate and correct conditions relating to the treatment of the insane in Illinois. As a result of his fearless drive on those guilty of outrages, cruelties were discontinued, the housing of the insane was benefited, and new divisions were added to the Cook County Hospital, including a building for the care of the tuberculous. Actually much of the tremendous development of this great medical center was due to the active interest taken by Billings.

Especially as a practitioner of clinical medicine did Frank Billings aid in the advancement of medical science. His practice soon came to include every notable citizen of Chicago and many from distant cities. At times the number of physicians and members of their families coming daily, even from great distances, to consult him proved almost embarrassing. His influence on his patients and their confidence in him was boundless. This relationship led to the establishment of the McCormick Institute for Infectious Diseases, of the Durand Hospital, of the Otho S. A. Sprague Institute, of the University of Chicago School of Medicine, and associated therewith the Bobs Roberts Memorial Hospital for Children, the Max Epstein

Dispensary, the Albert Merritt Billings Hospital, the Frank Billings Clinic, the Billings Library, and the Lasker and the Douglas Smith Foundations for research.

In the World War, when Dr. Billings was 62 years old, he became medical adviser to the Provost Marshal General and drew up the plan of examination of men who came before draft boards. Later he was attached to the office of the surgeon general as chief of the division of physical reconstruction of disabled soldiers, which antedated the development of the veterans' bureau. In this service he received the Distinguished Service Medal of the United States and the Order of Leopold of Belgium and was made an Officer of the Legion of Honor of France.

In June, 1917, he was appointed chairman of a commission of sanitary, social, medical and food distribution experts to proceed to Russia under the auspices of the Red Cross, to make a survey of the social needs of the Russian people. His own account of the work of the commission, published in THE JOURNAL, reveals his essential humanity and the breadth of his interests.

Nor did these multitudinous activities as teacher, practitioner, organizer and builder prevent Dr. Billings from a significant career as a medical investigator. His published contributions include case reports which bring forth new observations, studies devoted to therapeutics, particularly the editorship of the Forchheimer "System of Therapeutics" and primarily leadership in the advancement of knowledge concerning focal infection. He inspired the research of E. C. Rosenow in this field, he led the group that published numerous papers on the control of tonsillitis, iritis, arthritis, chorea and similar conditions, and he gave the Lane Medical Lectures on this topic, which were later made available in book form.

In his death a tower of strength is lost to American medicine. He was big, genial, sympathetic, full of humor and human kindliness. He radiated power. The most significant aspect of his career is his record of battles waged for right in medicine, in civic affairs, in human relationships. He was devoted to his patients, to his friends, to his assistants, to his associates and to his family, and they loved him with a love approaching adoration.

Edward Wyllys Taylor ✠ Boston; Harvard University Medical School, Boston, 1891; delegate from the Section on Nervous and Mental Diseases, American Medical Association in 1921; James Jackson Putnam emeritus professor of neurology, Harvard Medical School; member and past president of the American Neurological Association; member of the Association for Research in Nervous and Mental Diseases, the New England Society of Psychiatry and the American Psychopathological Association; visiting neurologist to the Long Island Hospital and formerly chief of staff of the neurological department and consulting physician to the Massachusetts General Hospital; assistant editor, 1899-1912, and editor in chief, *Boston Medical and Surgical Journal*, 1912-1915; for several years editor of the *Journal of Nervous and Mental Disease;* author of "Psychotherapy: Mental Elements in the Treatment of Disease"; aged 66; died, August 17.

Henry P. Birmingham ✠ Brigadier General, U. S. Army, retired, Washington, D. C.; University of Michigan Medical School, Ann Arbor, 1876; entered the Army as an assistant surgeon in 1881; was made a major in the medical corps of the U. S. Army in 1898; retired as a colonel in 1918; was again in active duty from 1918 to 1922; retired as a brigadier general in 1930 by operation of law; fellow of the American College of Surgeons; aged 78; died, May 4, in the Walter Reed General Hospital, of arteriosclerosis.

Stewart Braisted Sniffen, White Plains, N. Y.; Columbia University College of Physicians and Surgeons, New York, 1922; member of the American Psychiatric Association; formerly assistant clinical professor of psychiatry, Graduate School of Medicine of the Division of the Biological Sciences, University of Chicago; aged 34; died, August 17, of an infection of the hand and pneumonia.

Joseph Mitchell Hancock, Chandler, Okla.; Hospital College of Medicine, Medical Department Central University of Kentucky, Louisville, 1905; member of the Oklahoma State Medical Association; aged 54; proprietor of a hospital bearing his name, where he died, in August, of burns received while operating a roentgen ray machine.

Jessica White Findlay ✠ Castile, N. Y.; University of Michigan Medical School, Ann Arbor, 1889; aged 72; died, August 4, in the Wyoming County Community Hospital, Warsaw, of coronary thrombosis, following a fracture of the neck of the femur.

Oliver R. Jeter, Mangum, Okla.; Baylor University College of Medicine, Dallas, Texas, 1911; member of the Oklahoma State Medical Association; on the staff of the Border-McGregor Hospital; aged 50; died, July 2, of intracranial hemorrhage.

George W. Winterstein, Portville, N. Y.; Jefferson Medical College of Philadelphia, 1878; member of the Medical Society of the State of New York; aged 80; died, August 17, in the Olean (N. Y.) General Hospital, of acute cholecystitis.

James Lewis Poston, Statesville, N. C.; Jefferson Medical College of Philadelphia, 1922; member of the Medical Society of the State of North Carolina; on the staff of Long's Sanatorium; aged 34; died, August 10, of heart disease.

Frederick Harrison Pierson, Seattle; Columbia University College of Physicians and Surgeons, New York, 1899; served during the World War; aged 58; died, August 3, in the Providence Hospital, of coronary thrombosis.

James J. Keyes ✠ Brooklyn; Long Island College Hospital, Brooklyn, 1885; on the staff of the Samaritan Hospital; aged 72; died, August 24, at his summer home in West Hampton Beach, Long Island, of heart disease.

Milton E. Van Fleet, Mount Vernon, N. Y.; Bellevue Hospital Medical College, New York, 1890; member of the Medical Society of the State of New York; died, September 3, of chronic myocarditis and nephritis.

Frederick Cuttle, Oakland, Calif.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1904; aged 56; died, August 6, of an overdose of a drug, presumably self administered.

A. Russell Johnston ✠ New Bloomfield, Pa.; Jefferson Medical College of Philadelphia, 1881; president of the Perry County Medical Society; aged 76; died, April 22, of cerebral hemorrhage and angina pectoris.

William Siegmeister ✠ Brooklyn; Fordham University School of Medicine, New York, 1913; aged 55; on the staff of the Israel Zion Hospital, where he died, September 1, of carcinoma of the intestine.

Alexander Daniel McKinley ✠ Des Moines, Iowa; Rush Medical College, Chicago, 1906; served during the World War; on the staff of the Broadlawns Polk County Public Hospital; aged 55; died in July.

Max Mandelbaum, Brooklyn; New York University Medical College, 1898; aged 61; on the staffs of the Jewish Sanitarium for Incurables and the Jewish Hospital, where he died, August 23, of typhoid.

John Flavius Maxwell, Resaca, N. C. (licensed, North Carolina, by years of practice); member of the Medical Society of the State of North Carolina; aged 84; died, July 16, of chronic endocarditis.

Willmer Hammond, West La Fayette, Ohio; Ohio Medical University, Columbus, 1905; member of the Ohio State Medical Association; county coroner; aged 58; died, August 31, of nephritis.

James Franklin Peyton, Stanford, Ky.; College of Physicians and Surgeons in the City of New York, 1867; Civil War veteran; for many years member of the city council; aged 93; died, August 1.

Harry Lee Beard ✠ Lewisburg, W. Va.; University of Virginia Department of Medicine, Charlottesville, 1893; served during the World War; aged 62; died, August 17, of carcinoma of the rectum.

George W. Todd, Salisbury, Md.; University of Maryland School of Medicine, Baltimore, 1885; on the staff of the Peninsula General Hospital; aged 71; died, May 27, of pulmonary tuberculosis.

Charles Sealey Green, Fostoria, Ohio; Medical Department of Western Reserve University, Cleveland, 1886; member of the Ohio State Medical Association; aged 72; died, August 24.

Joseph J. Growney, Kansas City, Kan.; Central Medical College of St. Joseph, Mo., 1897; member of the Kansas Medical Society; aged 64; died, June 4, of carcinoma of the breast.

Burt C. Johnson ✠ Buffalo; University of Buffalo School of Medicine, 1890; for many years on the staff of the Deaconess Hospital; aged 63; died in August of coronary thrombosis.

Nelson Smith, Jr., New York; New York Homeopathic Medical College, 1881; aged 74; died, August 7, when he jumped from a fifth floor window of the Flower Hospital.

Edward Austin North ✠ Newport, Ky.; Eclectic Medical Institute, Cincinnati, 1906; aged 50; died, August 8, in the Fort Hamilton Hospital, Hamilton, Ohio, of heart disease.

John Robert Carney ✠ Delphi, Ind.; Rush Medical College, Chicago, 1902; aged 54; died, August 15, in St. Vincent's Hospital, Indianapolis, of acute prostatitis and septicemia.

Martha Hughes Cannon, Los Angeles; University of Michigan Medical School, Ann Arbor, 1880; formerly member of the state legislature of Utah; aged 74; died, July 10.

William C. Cecil, Stark, Kan. (licensed, Kansas, 1901); Civil War veteran; aged 81; died, August 8, in a hospital at Parsons, of cardiac decompensation and arteriosclerosis.

Lemuel E. Hecker, Toledo, Ohio; Cincinnati College of Medicine and Surgery, 1885; aged 77; died, August 25, in the Mary Rutan Hospital, Bellefontaine, of heart disease.

John Conrad Gilland, Greencastle, Pa.; Jefferson Medical College of Philadelphia, 1876; member of the Medical Society of the State of Pennsylvania; aged 83; died, June 7.

Cyrus Rexford Baker, Houston, Texas; New York Homeopathic Medical College and Hospital, 1893; served during the World War; aged 63; died, July 29, of heart disease.

Jacob Smyser Alison, Shamrock, Fla.; College of Physicians and Surgeons, Baltimore, 1896; aged 59; died, August 1, in a hospital at Jacksonville, of coronary thrombosis.

Edwin Massie Bell ⊕ Allenwood, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1922; aged 34; died, August 20, in a hospital at Danville, of pneumonia.

Nat Strickland, Dunwoody, Ga.; Hospital Medical College, Eclectic, Atlanta, 1909; aged 50; died, August 13, in a hospital at Atlanta, of acute appendicitis and paralytic ileus.

Frank Hynard Edsall, Wilmington, Del.; University of Pennsylvania School of Medicine, Philadelphia, 1885; aged 70; died, August 22, of arteriosclerosis and myocarditis.

John Tilden Harbold, Dallastown, Pa.; Temple University School of Medicine, Philadelphia, 1909; also a pharmacist; aged 55; died, August 9, of cerebral hemorrhage.

Jacob Livingston Roseboom, Cherry Valley, N. Y.; College of Physicians and Surgeons in the City of New York, 1880; aged 79; died, August 9, of senile dementia.

Daniel O. White, Knox, Ind.; American Medical College, Indianapolis, 1895; aged 67; died, August 9, in the Holy Family Hospital, La Porte, of heart disease.

Jay Thornton Barnsdall ⊕ Buffalo; University of Buffalo School of Medicine, 1897; aged 62; died, September 6, of coronary thrombosis and diabetes mellitus.

David C. Barnett, Hemlock, Ind. (licensed in Indiana by the state board of medical examiners, year unknown); Civil War veteran; aged 93; died, June 15.

John Adolph Price, New York; Medical Department of the University of the City of New York, 1893; aged 69; died, August 10, of carcinoma of the lung.

Anthony J. Karalius, Chicago; Loyola University School of Medicine, Chicago, 1916; aged 42; died, August 23, of cyanide poisoning, self-administered.

Roland O. Harris, Carrollton, Mo.; Cincinnati College of Medicine and Surgery, 1873; aged 81; died, August 5, of acute dilatation of the heart and uremia.

Henry R. Tuthill, Bay Shore, N. Y.; Long Island College Hospital, Brooklyn, 1896; aged 58; died suddenly, August 9, of heart disease, while swimming.

Francis Joseph Burger ⊕ Brooklyn; University of Pennsylvania School of Medicine, Philadelphia, 1889; aged 65; died, August 16, of heart disease.

Aaron Fuller Hill, Columbus, Ohio; Kentucky School of Medicine, Louisville, 1880; aged 78; died, June 25, in the State Hospital, of arteriosclerosis.

Carleton H. Bonney, Springfield, Mass.; Baltimore Medical College, 1895; aged 64; died, May 23, of cerebral hemorrhage and arteriosclerosis.

John E. Wallace ⊕ Seattle; Missouri Medical College, St. Louis, 1891; served during the World War; aged 67; died, July 31, of heart disease.

George Hial Moulton, Coldwater, Mich.; Bellevue Hospital Medical College, New York, 1892; Civil War veteran; aged 91; died, July 10.

Aurelius E. Smith, Utica, Ohio; Starling Medical College, Columbus, 1883; aged 75; died, August 19, in Columbus, of cirrhosis of the liver.

John Frank Migdalski, Detroit; University of Michigan Homeopathic Medical School, Ann Arbor, 1914; aged 41; was found dead, June 18.

William Isaac Hayes, Powderly, Ala.; Southern Medical College, Atlanta, 1885; also a druggist; aged 72; died, March 27, of heart disease.

Finlay MacMillan, Sheet Harbor, N. S., Canada; Dalhousie University Faculty of Medicine, Halifax, 1872; aged 88; died, June 21.

Henry Joseph Jeffress, Kansas City, Mo.; Tufts College Medical School, Boston, 1930; aged 30; died, March 20, of lobar pneumonia.

Joseph T. Bazan, Kansas City, Kan.; Central Medical College of St. Joseph, Mo., 1896; aged 56; died, June 11, at Cherokee, Iowa.

Andrew W. Bice, Spencerville, Ohio; Kentucky School of Medicine, Louisville, 1896; aged 63; was found dead, August 9, of heart disease.

Michael John Cronin ⊕ Boston; Harvard University Medical School, Boston, 1898; aged 61; died, August 7, of arteriosclerosis.

William McKenzie McLeod, Sydney, N. S., Canada; Bellevue Hospital Medical College, New York, 1875; aged 77; died, June 12.

John B. Rees, Mapleton, Kan.; College of Physicians and Surgeons, Keokuk, Iowa, 1891; aged 84; died, May 3, of diabetes mellitus.

Lorin A. Beard, Pioneer, Ohio; Michigan College of Medicine and Surgery, Detroit, 1890; aged 70; died, August 20, of heart disease.

Franklyn Pierre Davis, Enid, Okla.; Eclectic Medical University, Kansas City, Mo., 1902; aged 64; died, August 1, of heart disease.

H. L. Edens, Bertram, Texas; Memphis (Tenn.) Hospital Medical College, 1891; aged 69; died, June 21, of cerebral sclerosis.

Samuel Lewis Summers, Ambler, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1883; aged 72; died, July 27.

Thomas Richard Jones, Milwaukee; University of Buffalo School of Medicine, 1890; aged 70; died, July 2, of heart disease.

John Welzmiller ⊕ New York; Bellevue Hospital Medical College, New York, 1898; aged 63; died, June 7, at Wingdale.

John B. Barwick, Blythe, Ga.; University of Georgia Medical Department, Augusta, 1880; aged 81; died, May 25.

Matthew T. Moorehead, West La Fayette, Ohio; Medical College of Ohio, Cincinnati, 1889; aged 70; died, May 19.

William John Wesley, Thornhill, Ont., Canada; University of Toronto Faculty of Medicine, 1897; died, June 6.

Winthrop Randall, Mobile, Ala. (licensed, Ohio, 1898); aged 85; died, July 9, of chronic interstitial nephritis.

J. L. Smith, Centertown, Ky.; Louisville Medical College, 1901; aged 56; died, August 9, of angina pectoris.

William N. McGee, McAllen, Texas; Medical College of Alabama, Mobile, 1890; aged 66; died, May 30.

Edgar F. Collins, Benton, Ohio; Starling Medical College, Columbus, 1879; aged 81; died, June 4.

Marriages

PERFECTO M. BIASON, Oshkosh, Wis., to Miss Daisy McCormick of Freedom, in Chicago, August 3.

HOLLAND WILLIAMSON to Miss Josephine Alexander Cathcart, both of Danville, Ill., September 10.

ALBAN PAPINEAU, Vineyard Haven, Mass., to Miss Kathryn Freyer Schramm of Philadelphia, August 27.

MAE H. D. MCINNES to Mr. Steve G. Pappas, both of West Frankfort, Ill., at Litchfield, August 16.

CLARENCE M. SCHULDT, Platteville, Wis., to Miss Zelma Itten of New Glarus, September 2.

CHESTER P. SWETT, Wynantskill, N. Y., to Miss Margaret Koons of Lancaster, Pa., June 30.

WILLIAM EARL GREGG, Elgin, Ill., to Miss Virginia Louise Tracy of Pontiac, September 14.

DEAN HOLLAND ECHOLS to Miss Frances Foerster, both of Milwaukee, September 10.

JAMES T. JUSTICE to Mrs. Sadie Anderson, both of Kernersville, N. C., July 8.

MARTIN L. RUTH to Miss Margaret Jenkins, both of Indianapolis, August 10.

Correspondence

DISLOCATION OF STERNUM

To the Editor: — The following unusual injury should be recorded: A Negro, about 30 years of age, was struck by a truck while he was bent forward. The truck forced him backward against a pillar before it was stopped, compressing the lower part of the chest and the abdomen. He complained that he felt a loud snap in his chest and subsequently had severe pain over the sternum at the level of the second and third ribs. Careful examination failed to reveal any injury, but tenderness was most marked over the joint between the manubrium and the corpus sterni. Quite by accident, while the hand was still pressing this area inward, the Negro decided to demonstrate the position he stood in when struck. As he did so the corpus slipped behind the manubrium and upward, demonstrating a complete dislocation of the joint, the second rib remaining attached to the manubrium.

The pain accompanying the dislocation caused a gasp, with quick erection of the patient's body and reduction of the dislocation. No treatment but rest seemed to be required. The patient failed to report for follow up.

D. R. Knapp, M.D., Kerrville, Texas.

TOXICITY OF CINCHOPHEN

To the Editor:—The increasing number of reported fatalities from cinchophen poisoning emphasizes the need of more accurate information concerning the toxicity of the newer synthetic drugs before they are introduced into therapy. It must be realized that the determination of the toxicity of a drug on lower animals is not an infallible index of the toxicity for man, since the protective or conjugating mechanisms in the human organism in many instances respond quite differently from those of the common laboratory animals. For example, man conjugates benzoic acid almost entirely with glycine, a substance that is synthesized only in limited amounts, whereas the dog combines the drug mostly with glycuronic acid, which is available in relatively large quantities. This probably accounts for the fact that a small dog will easily tolerate 5 Gm. of benzoic acid, while a 10 to 15 Gm. dose in man will frequently cause untoward symptoms. The study of the fate of a drug in the body is apt to throw considerable light both on its toxicity and on its pharmacologic action.

In considering the chemistry of cinchophen, one finds that it is a weak acid and contains an alpha carboxyl group. Since weak aromatic acids are apparently eliminated with difficulty, as I have recently pointed out (*J. Biol. Chem.* **97**:403, 1932), the body attempts to convert the weak acid to a stronger one by means of conjugation. But the conjugation with glycine of an alpha carboxyl group, like that of a carboxyl group with substitution in the ortho position, takes place with difficulty (*J. Biol. Chem.* **96**:83 [April] 1932) and results in a delayed elimination. This prolonged excretion allows a partial oxidation of the cinchophen molecule. Dohrn (*Biochem. Ztschr.* **43**:240, 1912), Skorczewski and Sohn (*Wien. klin. Wchnschr.* **25**:593, 1912), and Rotter (*Ztschr. f. exper. Path. u. Therap.* **19**:176, 1917) have found hydroxy derivatives of cinchophen in the urine, and Lichtman (*Arch. Int. Med.* **48**:98 [July] 1931) has studied the output of the hydroxy compound in various liver diseases. It is quite probable that the introduction of these phenolic groups into the cinchophen molecule is responsible not only for the therapeutic action but for the toxic effect as well. There is no evidence that the quinoline nucleus breaks up and yields the toxic ring of benzene, as was proposed by Willcox (*Brit. M. J.* **2**:273, 1926) and recently again quoted by Weis (The Journal, July 2, p. 21). Exact quantitative data on the fate of cinchophen in the body are still lacking. There is presumptive evidence that it becomes conjugated, for after its administration a levorotatory substance appears in the urine. The composition of this optically active compound has not been determined. It is apparently produced more rapidly in the dog than in man.

Since liver damage, especially the types associated with jaundice, impairs certain conjugating processes, as I have recently found (*Proc. Soc. Exper. Biol. & Med.* **29**:1204 [June] 1932) it can readily be seen why it is particularly dangerous to give cinchophen to patients with a history of liver involvement. It might also be suggested that since liver damage diminishes the synthesis of glycine, and since this amino-acid plays an important rôle in the detoxication of many weak aromatic acids, it may perhaps be found useful in the treatment of cinchophen poisoning.

Armand J. Quick, M.D., Theresa, Wis.

INTRACUTANEOUS TUBERCULIN TEST

To the Editor:—In the editorial entitled "The Intracutaneous Tuberculin Test" (The Journal, July 23), the quantitative intracutaneous test is recommended as described by Hart. Many writers already have recommended this quantitative procedure. Auke van Balen has described the "Dosierung in der Tuberkulindiagnostik nebst Mitteilung der Erfahrungen über lokale Tuberkulinreaktionen bei klinisch gesunden Erwachsenen" (*Beitr. z. Klin. d. Tuberk.* [Brauer's] **15**, 1910; *Nederl. tijdschr. v. geneesk.* **2**:90, 1908). In the article in the *Nederlandsch tijdschrift voor geneeskunde*, "Een nieuwe techniek der tuberculine-inspuiting," he described the intracutaneous way of testing before Mantoux did so.

G. F. van Balen, M.D., 's-Hertogenbosch, Holland.

REACTION AFTER NUPERCAINE

To the Editor:—Referring to a communication on this subject in The Journal, September 3, page 849, the proper strength of nupercaine for subcutaneous injection is 0.1 per cent. The patient apparently suffered from an overdosage rather than an unusual susceptibility; "her reaction" was not what one might expect from an idiosyncrasy to one of the cocaine group; may I refer Dr. Jensen to an article which I contributed to The Journal (Local Anesthesia Agents: Preventive and Emergency Treatment of Toxicity with Especial Reference to Barbituric Acid Derivatives, Aug. 25, 1928, p. 555) and to a more recent discussion in the *Journal of the Michigan State Medical Society*, November, 1930 (Local Anesthetic Idiosyncrasies: Treatment).

Dr. Jensen speaks of the usual preparation: such preparation should always include the administration of a soluble barbital preparation, and there are a number of them.

In a discussion before a section at the annual session of the American Medical Association in Philadelphia, the use of 1 per cent was inadvertently mentioned and printed; this is unfortunate, and in fact inexcusable on the part of a man who I know is familiar with the proper percentage.

Edward G. Martin, M.D., Detroit.

APPENDICITIS

To the Editor:—Allow me to comment on Dr. F. K. Boland's article on appendicitis in The Journal, August 6, and especially to emphasize Dr. L. F. Barney's discussion on this article.

The treatment of ileus from surgery in acute conditions is the avoidance of enterostomy or similar procedures. Stress should be on continuous gastric lavage from the time emesis starts. The stomach washings should be kept clean. Sugar or dextrose should be given by the intravenous route, and a continuous rectal drip of coffee, dextrose and tap water should be maintained. Also salt solution should be given under the

skin by hypodermoclysis. I aim to give 16 pints in twenty-four hours by this method, 16 pints that remain, since the water loss by lavage exceeds the intake. Also digitalis and strychnine should be used as stimulants.

This procedure should be preached in every medical and surgical session. There are still too many deaths from this complication and I know that physicians generally are not utilizing this most valuable method. The use of the nasal gastric tube is of value in other conditions wherever lavage is practiced.

M. F. SMITH, M.D., Raton, N. M.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

TREATMENT OF SYPHILIS IN INFANT

To the Editor:—In response to a query on the treatment of syphilis in THE JOURNAL, July 2, you referred the writer to Venereal Disease Information; volume 10, number 2, Feb. 20, 1929, entitled "The Management of Syphilis in General Practice." I have under my care a boy, now 14 months of age, weighing only 13 pounds (6 Kg.). His mother, with a strongly positive Wassermann reaction, received, I am told, six intramuscular treatments with neoarsphenamine previous to the birth of the child. The child has received mercury by mouth and inunction but irritability and failure to gain persist. His Wassermann reaction is also strongly positive. My intention was to treat him with 0.15 Gm. of neoarsphenamine intramuscularly for eight weeks, followed by ten weekly intramuscular treatments of mercuric salicylate, 1 grain (0.065 Gm.) in oil. After the eighteen weeks of such treatment a month's rest would be allowed and the treatments resumed as outlined until clinical and serologic evidence indicated their discontinuance. The mother has responded to treatment in this fashion and is now Wassermann negative. I should like your reaction to the course outlined and also where I may obtain the periodical mentioned in my first paragraph and at what cost. Please omit name.

M.D., Connecticut.

ANSWER.—It is inadvisable, because of local pain and the danger of necrosis, to give neoarsphenamine intramuscularly either to adults or to children. Sulpharsphenamine is a much better drug for the treatment of congenital syphilis in infants. It may be given intramuscularly with relatively little pain. It is better tolerated by infants and children than by adults, in whom its use is not advised because of its tendency to produce severe reactions (dermatitis, nephritis, blood dyscrasias). An average dose of sulpharsphenamine for an infant is from 15 to 25 mg. per kilogram of body weight, beginning with the smaller and increasing gradually to the larger dose.

Bismuth is a therapeutically more active drug than mercury. The use of an insoluble salt, preferably the salicylate, suspended in oil is advised. The dose for infants is from 2 to 4 mg. per kilogram of body weight, best administered with a tuberculin syringe. The use of insoluble mercurial salts in infants is not advised, and in particular the dose of mercuric salicylate mentioned by the correspondent is far too large and likely to prove highly dangerous.

A suggested plan of treatment for the child is to give a course of eight weekly intramuscular injections of sulpharsphenamine in the dosage advised, followed by eight or ten weekly intramuscular injections of a bismuth compound, and to repeat this alternation of courses of the two drugs, without rest intervals if possible, for a total minimum period of two years, regardless of serologic evidence. It is more than probable that, in view of the fact that the infant is now 14 months old, the blood Wassermann reaction will prove to be persistently positive in spite of treatment. The age of the child also makes advisable continuous rather than intermittent treatment; i. e., the situation, so far as immunity is concerned, is still analogous to that in early acquired syphilis in adults. If the infant were still younger, say 6 months or less, continuous treatment would be absolutely essential. Since he is now 14 months old, an occasional short interpolated rest period will probably do no harm, especially if it follows a course of heavy metal; but rest periods should not be encouraged.

Before this suggested treatment plan is started, or as soon as possible thereafter, the child's spinal fluid should be examined. If it proves to be positive, some alteration in plan will probably be necessary.

Venereal Disease Information is published monthly by the United States Public Health Service and is available through the Government Printing Office at a yearly subscription of 50 cents. A reprint of the article mentioned may be obtained by writing the Assistant Surgeon General in Charge of Venereal Diseases, U. S. Public Health Service, Treasury Department, 16 Seventh Street, Southwest, Washington, D. C.

FATAL AIR EMBOLISM

To the Editor:—Recently a death came to my attention during my duties as coroner. A boy who had associations with a woman, aged 24, attempted abortion by pumping air into the vagina with an automobile pump. She is said to have died ten minutes later but may have died immediately. She was in perfect health and pregnant between four and one-half and five months. An autopsy was done before the confession as to the cause of death was obtained. Hence, it was not noted whether or not there was air in the coronary or cerebral vessels. However, at autopsy it could not be shown that the uterus contained blood, and the membranes were intact. No other cause, in fact, no cause of death, was found. All organs were apparently normal. Examination of the stomach contents revealed no poison. Could you give us any information as to the possibility of this method of abortion causing death and how? I am not able to find literature on this possibility. The coroner's jury was not able to convict the boy, since the pathologist could not demonstrate cause of death. However, the heart was examined after it was detached and removed and it came to the attention of two of us that the coronary vessels had considerable air in them. Whether this came from the air injection into the vagina or was sucked in after the heart's removal we do not know.

M.D., Iowa.

ANSWER.—From time to time cases are reported of fatal air embolism during attempts of various kinds to produce abortion or in the course of vaginal injections with leaking syringes. Uterine air embolism is discussed especially in works of legal medicine (Peterson, Haines and Webster: Legal Medicine and Toxicology by Many Specialists, ed. 2, **1**:996, 1923. Ziemke, E.: Ueber plötzliche Todesfälle bei Schwangerschaft und Geburt, *Deutsche Ztschr. f. d. ges. gerichtl. Med.* **9**:129, 1927). In air embolism by way of the pregnant uterus there occurs more or less detachment of the placenta with opening of the uterine sinuses. Possibly in certain cases death occurs so quickly that only little bleeding takes place. From the uterus the air passes to the right side of the heart and the lungs, from which some air may reach the general circulation, including the coronary arteries. If there should be a patent foramen ovale, air might pass directly from the right into the left auricle and on into the arterial system. Was the foramen ovale open in the case in question? It is conceivable, further, that massive accumulations of air in the right heart chambers might so clog the pulmonary arterial circulation as to force air into the coronary vessels in a retrograde manner through the coronary or thebesian veins (Rukstinat, G. J., and LeCount, E. R.: Air in the Coronary Arteries, THE JOURNAL, Dec. 8, 1928, p. 1776. Rukstinat, George: Experimental Air Embolism of the Coronary Arteries, ibid. Jan. 3, 1931, p. 26). Whether air can be "sucked into" the coronary arteries after removal of the heart need not be considered because, like arteries in general, the normal coronary arteries after death are closed by contraction. In all cases of suspected air embolism by way of the pregnant uterus, postmortem invasion of the gas bacillus with the subsequent production of gas in the blood must be excluded by proper bacteriologic examination. This applies absolutely to all cases in which some time elapses between the death and the necropsy and in cases of obvious signs of decomposition of the body. In the case in question the conditions for producing air embolism through the uterus seem to have been favorable, but in view of the results or lack of results of the necropsy no definite conclusion may be drawn.

SALT IN DIET OF WORKER WITH CYANIDES—HYDROGEN PEROXIDE BURNS

To the Editor:—1. I am interested in getting some information on the ingestion of salt and its effect on a person working in a hot room in the presence of cyanide. It is my opinion that the intake of sodium chloride by a person who is working in a hot room in the presence of cyanide and perspiring profusely is helpful in the elimination of the cyanide absorbed and prevents retention of it in the body. I shall greatly appreciate any suggestion you may make as to where I may procure information along this line. 2. Also, have you any data on burns from hydrogen peroxide 94 per cent solution?

E. L. BURHYTE, M.D., Niagara Falls, N. Y.

ANSWER.—1. The action of cyanides, after entry into the body, is not so exactly established that any stand may be taken as to chemical changes induced by sodium chloride. So complex is the situation that arguments may be supplied both in support

and in opposition to the ingestion of salt in connection with exposure to cyanide. It may be observed that high water intake without additional salt content is conducive to a freer perspiration than otherwise. If so, this may lead to lessen the quantity of cyanides eliminated in perspiration. On the other hand, undue sodium chloride losses are favorable to fatigue, which in turn calls for a greater intake of air into the lungs minute by minute. Thus a larger quantity of cyanides may enter the lungs. However, all considered, the use of small quantities of sodium chloride in drinking water supplies is favored for hot occupations leading to excessive losses of chlorides. Technical considerations have been presented by Glover (*J. Indust. Hyg.* **13**:347 [Dec.] 1931).

2. A 94 per cent solution of hydrogen peroxide may refer to either weight or volume. In this case it is probably volume per cent, equivalent to the well known 30 per cent (by weight) hydrogen peroxide solution. This is a strong oxidizing solution, capable of destruction of tissues.

CROSSED TRACTS IN THE CENTRAL NERVOUS SYSTEM

To the Editor:—Could you inform me at what level in the animal kingdom the central nervous system assumes the crossed form as seen in man, that is to say, the left cerebral cortex controlling the right side of the body, and so on? I should be gratified if you would direct me to references in English on the subject? M.D.

ANSWER.—A definite pyramidal system is found only in the mammals. It is found definitely in the opossum and possibly even in the ornithorynchus. There are no pyramidal tracts in forms lower than the mammals. The crossing is always complete except in the primates. In the opposum the pyramidal tract descends only through the cervical region, there being no pyramidal tract system for the lower extremities.

With respect to the crossing of conduction pathways in the central nervous system, one may consult L. Jacobsohn-Lask (*Ztschr. f. d. ges. Neurol. u. Psychiat.* **112**:318, 1928), where a few pertinent English references will be found. Suffice it to say that partial crossing of conduction pathways is the primary situation. Total crossing of nervous pathways has developed only in certain situations and under special conditions.

EPINEPHRINE OR EPHEDRINE IN SHOCK

To the Editor:—Please state your views regarding the action of and the advisability of using epinephrine (adrenalin) in cases of either pure or hemorrhagic surgical shock in which the arteries are already much contracted. Even if the heart may respond for a short time with improved contractions, is the total and final result beneficial as regards life, and even as regards physiologic action on the arteries and the heart, which largely determines life or death? Opinions differ so far as I am aware. What medication do you advise? Of course, heat and shock block should be used. Strophanthus and digitalis would act much like epinephrine, and digitalis would be too slow. Please omit name.

M.D., New York.

ANSWER.—The action of epinephrine is so transient that it is rarely of any definite value except in acute cardiac conditions associated with a sudden dangerous drop in blood pressure. Given in minute doses in subcutaneous saline solution, it has not proved of definite value. Any rise in blood pressure due to epinephrine is usually followed by a drop in pressure which may be detrimental to the patient.

Although the peripheral arteries may be contracted in shock, the pulmonary and abdominal vascular systems may be markedly congested.

It is probable that many cases of shock are the result of some hemorrhage at operation supplemented by internal vasomotor dilatation. Toxemia, cardiac weakness or a number of other factors may predominate in other cases.

Ephedrine is of definite value as a prophylactic against shock, if given before the blood pressure has fallen. It does not seem to be of value after shock has developed.

Measures for increasing blood volume should be instituted except when the shock is due to acute cardiac decompensation. This should be done before shock actually develops. Saline solution should be given subcutaneously or slowly by the intravenous route and may be all that is necessary. Occasionally in severe shock an immediate blood transfusion should be given.

In acute cardiac decompensation, caffeine sodiobenzoate and digitalis should be given by hypodermic injection. Strophanthin may be given in small doses by hypodermic injection in case of impending cardiac collapse. Camphorated oil has found some favor as an emergency stimulant.

Lowering the head by tilting the whole body is of great benefit in shock, especially when there is splanchnic congestion, and should be maintained until the patient is definitely better. This position is also urgently indicated in air embolism.

Careful preparation of the patient, the use of local or gas anesthesia, and delicate technic with multiple stage operations will reduce shock to a large extent.

Toxic patients and those who are very young or old require special preparation and the more frequent use of preventive measures.

FALLEN ARCHES

To the Editor:—Since a small child I have been bothered tremendously with fallen arches. I know that it is not due to improper or faulty care of the feet, because I have always worn arch support shoes and I have taken treatments from several physicians without avail. I feel quite handicapped because I tire on my feet easily and get a bad aching in my legs on walking even a short distance. I would appreciate sincerely if you could let me know the prognosis of surgical repair of the arches. How long must one remain in bed or go without walking after such an operation and how much of a cure can be expected?

THEODORE E. MANDY, Washington, D. C.

ANSWER.—The prognosis following the surgical repair of depressed arches is excellent. The time required in bed is usually a few days. The time required for non-weight bearing is usually six weeks.

The degree of cure that can be expected depends on the surgeon and the patient.

The age, which makes considerable difference, is not given. There are numerous operations for the correction of depressed longitudinal arches, the most important of which are named after Perthes, Gleich, Lord, Clark, Miller and Hoke.

There are many factors in the production of fallen arches, including, in addition to shoes, the question of heredity, posture, weight, metabolism, circulation, foci of infection, muscle power, occupational trauma, arthritis, gout and exposure.

CLIMATE FOR TUBERCULOSIS

To the Editor:—Please give me the most favorable climatic locations in the West for pulmonary tuberculosis. How do Houston and San Antonio rate in this classification?

A. B. GOLDSTON, M.D., Pampa, Texas.

ANSWER.—There is no climate which is specific for the treatment of tuberculosis. There are four considerations that one must give heed to in advising climatic treatment:

1. The problem of nostalgia, which has prevented many tuberculous individuals from making a recovery when they were sent many miles from home and their immediate family.

2. The economic condition of the patient. He must be able to afford the necessities of tuberculosis treatment over a prolonged period of time.

3. The type of disease and the extent of pathologic change are also important considerations. Patients in a moribund condition are sometimes ordered to health resorts and die en route. One must also remember that the newer methods of treatment, particularly pulmonary collapse, may be necessary and this should also be considered when selecting the abode.

4. The season of the year is also a determining factor. Winter resorts at a lower altitude and a higher temperature may be preferable, such as Tucson, Ariz., Albuquerque, N. M., and Palm Springs, Calif. In the summer, Colorado Springs, Colo., San Antonio, Texas and Sanata Fe, N. M., may be mentioned as examples.

APHONIA AFTER ROENTGEN THERAPY

To the Editor:—A woman had a thyroidectomy performed several years ago. For some time after the operation she was able to talk only in a whisper and she had a feeling of constriction in her throat. At the present time she is suffering from numerous flat warts. These are chiefly situated on the neck and chest. I have given her three one-fourth unit doses of unfiltered x-rays at weekly intervals. An exposure was made on each side of the neck. After the third treatment she again experienced the feeling of constriction and loss of voice. I refused to give her any more x-rays. I should like to know whether this dosage of x-rays would be sufficient to cause these symptoms. Kindly omit name.

M.D., Ohio.

ANSWER.—Assuming that a unit dose amounts to about 260 roentgens (the international unit of x-ray dosage), the physician gave at each x-ray application about 40 roentgens. With unfiltered radiation it is extremely difficult to understand now there could be any appreciable effect anywhere beneath the skin and subcutaneous tissues, with a dose no greater than seems to have been given.

It is safer, however, to measure the dosage with a roentgen dosimeter than to estimate the dosage in "units." It is especially important that each tube be calibrated in its delivery of roentgens per minute at given distances from focus to skin, with

given kilovoltages and milliamperes, and according to the size of the skin area treated. It is surprising how much difference there may be in the dosage output of two tubes which seem perfectly comparable under given conditions of voltage, time, milliamperes and distance. A recent test on two such tubes showed that one gave out 23 roentgens of unfiltered radiation per minute whereas another tube of the same make and similar type gave out 70 roentgens per minute under similar conditions.

It does not give much comfort to speak of idiosyncrasy, for the consensus is against the existence of such a sensitization against the roentgen rays. Furthermore, it is difficult to understand how there could have occurred as a result of the roentgen therapy such symptoms as feeling of constriction and loss of voice without gross evidence of a roentgen effect on the skin itself.

It would be possible to treat this case by making an application to each individual wart, encircling it with a protective layer of lead foil having an opening the exact size of the wart. The roentgen rays should be directed (in this case, on account of the question raised) in an oblique manner, so that the larynx and trachea need not be in the line of radiation at all.

VESICULAR EPIDERMOPHYTOSIS

To the Editor:—A man, aged 38, strong and healthy in every other way, has skin trouble, which first appeared about thirteen years ago. Small, watery blisters come in the palms of his hands and on the soles of his feet. The blisters are first noticed deep under the skin; they come to the surface and when just under the skin the watery substance turns to a yellowish pus and, if not picked, the pus forms a scale and breaks through the skin and peels off. The trouble is not found on any other part of the body. He has consulted other dermatologists, has been to Hot Springs, and none of this has cured him. At times the trouble is hardly noticeable but in a short time it comes back as bad as ever, or worse. He has had several blood tests made and all were negative. Please let me have your opinion on this case. Please omit name.

M.D., Tennessee.

ANSWER.—The clinical description of this case fits in with that of a recurring vesicular epidermophytosis. For years there has been a controversy among leading dermatologists as to whether the vesicular eruptions limited to the hands and feet are due to fungi and therefore belong to the mycotic dyshidrosis group or whether they are of systemic origin and to be classified as true dyshidrosis or pompholyx of Tilbury Fox.

Recent observers have reported negative microscopic and cultural examinations in lesions of the hands that are clinically apparently mycotic and positive results in the lesions of the feet. Based on these observations there has arisen the clinical concept of epidermophytids or trichophytids which account for the eruption on the hands on the basis of the hematogenous absorption of fungi or their toxins from the feet. A trichophytin skin test might be of value and cultural studies should be made.

OBESITY

To the Editor:—There are a number of questions in connection with the subject of obesity and its treatment which I should like to have answered from the standpoint of the latest work: 1. Is the classification of endogenous and exogenous obesity usually accepted at the present time? 2. In any scheme of reduction, what examinations should be made of the patient? Should blood pressure, urine, pulse and respiration be kept under surveillance? 3. Should symptoms of dizziness, headaches, fatigue, rapid heart and respiration call for a cessation of the dietary regimen? 4. Is it possible to reduce the weight in all cases of obesity? 5. Some tables say that no one should permit his weight to be more than 20 pounds greater than the specified weight for height and age as given in those tables. Please give me your opinion as to this. Please omit name.

M.D., Texas.

ANSWER.—1. The classification of endogenous and exogenous obesity is usually accepted. Often it is extremely difficult to differentiate the two types, and some men, such as Newburgh, do not accept the classification. However, generally speaking, obese patients definitely divide themselves into a group in which the excess is due to marked increase of food intake or lessened energy expense and the group in which these factors at least are not apparent. Frequently in the latter group other signs or disturbances of the ductless glands are manifested.

2. No scheme of reduction should be undertaken without a complete physical examination, and the patient should be kept under constant observation.

3. Symptoms such as dizziness, headaches, fatigue and rapid heart call for a cessation of the dietary regimen when no other cause for the symptoms is found.

4. Under proper conditions, the weight can be reduced in all cases of obesity. This, however, frequently implies a complete and constant control of the diet intake. The rate of reduction varies tremendously in different individuals. Also, the honesty and willingness to cooperate, which are essential in dietary reduction methods, are not always the same.

5. There can be no absolutely sound general rule regarding specified weight for any given individual. Ordinarily speaking, overweight is dangerous in direct relationship to the amount of overweight; but there are some individuals who because of a large bony frame seem to be in better general health with a slight excess of weight. A normal person, for instance, who has the general tendency toward largeness of body may well carry more weight than another person the same height and age but with a smaller bony structure.

EXTRASYSTOLES

To the Editor:—A man, aged 32, white, married, not a user of alcohol or tobacco in any form, recently developed an extrasystole followed by a hesitant beat. The beat following the hesitation is extra large and hard. The patient complains of discomfort in the chest, a feeling of faintness, and an annoying, indescribable, feeling during the extrasystole and the next hesitant beat. The man seems to be normal, the teeth and throat are normal, the Wassermann reaction is negative, the blood pressure is 120 systolic and 65 diastolic, the heart beats number from 68 to 74 per minute, and the kidneys and urinary organs are normal. The patient does not engage in extra hard work and he looks well cared for. The condition seems to worry him most when he is not extremely active physically, although he notices it at any time. Please give me your opinion on this condition, with prognosis and treatment. The literature I have is scanty as to a definite line of treatment. Is exercise contraindicated? The patient often complains of this feeling at breakfast and, if so, rest does not seem to help it. The extra beat occurs as often as from four to six times a minute.

W. B. BARTON, M.D., Briceville, Tenn.

ANSWER.—It would be hazardous to make a diagnosis on the basis of the information given. Extrasystoles may be due to a variety of causes apart from organic heart lesions, and it may well be that worry or fatigue may be responsible.

The prognosis of such a case is good, and the only treatment necessary is appropriate hygienic-dietetic advice.

It would be advisable to make a careful study of the mediastinum to make sure that nothing is amiss there, and it would also be well to assure the patient that most cases of extrasystoles at his age are not serious. A Wassermann test and an electrocardiogram may give further information.

FRACTURE OF BODY OF VERTEBRA

To the Editor:—1. Is it possible to fracture a body of a vertebra, especially the last dorsal or the first lumbar, by purely indirect violence, such as lifting a rock, without some preexisting disease? 2. What is the most common cause of a compression fracture of the vertebral bodies?

H. J. ARBOGAST, M.D., Rock Springs, Wyo.

ANSWER.—1. It is possible but highly improbable.

2. It is injury of the jackknife type or cave-in in a coal mine. The most commonly fractured vertebrae are the twelfth thoracic and the first lumbar. One authority would suspect a preexisting pathologic condition, such as a cyst, tuberculosis or malignant growth. Kümmell's disease must be considered. Several important factors should have been stated, such as the age of the patient, previous condition of the back, infections, tumors and glandular disturbances.

SPLENOMEGALY OF HEMOLYTIC JAUNDICE

To the Editor:—A girl, aged 19, has had chronic hemolytic jaundice of many years' duration, diagnosed five years ago. Following a series of high voltage roentgen treatments four years ago the patient has been fairly comfortable, except for an occasional acholuric crisis. The spleen was enlarged at the first examination five years ago but did not increase in size following the irradiations until the past few months. It now fills the upper right quadrant of the abdomen. During the last two crises, blood transfusions have averted disaster. Could x-rays of sufficient dosage destroy this organ, or will it be necessary to subject the girl to the risk of splenectomy? HENRY HALL ZEIGEL, M.D., Collbran, Colo.

ANSWER.—Roentgen treatment for the splenomegaly of hemolytic jaundice is not well established and it is questionable whether any real good results from it. No report of roentgen treatment for hemolytic jaundice can be found in the *Index Medicus* or the *Quarterly Cumulative Index Medicus* from 1922 to 1932. Minot and Lee in Nelson's Loose Leaf Medicine, and Krumbhaar in Osler's Modern Medicine, both say, however, that the treatment has proved beneficial in some cases but that the best gradation of dosage is still in doubt. Krumbhaar writes that it should not be allowed to replace more valuable therapy. It seems certain that one could not give a sufficient

dosage of x-rays to destroy the spleen without detriment to the patient. Splenectomy has been used for a number of years and a large series of cases in various clinics have been symptomatically cured of the disease as the result of the operation. The fragility of the erythrocytes, which is elevated before operation usually, however, usually does not return to normal after operation. One should be careful not to operate during a crisis, when blood transfusions may be necessary.

ANAPHYLAXIS AND ANESTHESIA

To the Editor:—What influence, if any, would a general anesthetic have on a patient who developed anaphylaxis? In my hospital work we frequently administer tetanus antitoxin to patients while they are under an anesthetic for suturing wounds, so if anaphylaxis occurred, what? Or can it occur under these circumstances? I have had physicians tell me it would not occur while the patient is under a general anesthetic.

B. J. MATTHEWS, M.D., Indianapolis.

ANSWER.—It has been found experimentally that acute anaphylactic shock does not usually occur in animals previously sensitized to foreign protein if the second dose of protein is given when the animals are anesthetized.

Bronfenbrenner found that certain anesthetics increase the antitryptic action of the blood. He suggests that in sensitized animals the anesthetic may thus temporarily reduce the activity of proteolytic enzyme and so slow the rate of splitting of the injected protein that acute symptoms of shock are averted. With recovery from the anesthetic the antitrypsin gradually decreases to normal, allowing the foreign protein to be split. The reaction is prolonged but its acuteness and severity are decreased. Working in a somewhat different field, Bronfenbrenner also found that the lethal action of botulinus toxin could be delayed somewhat by anesthetics; and he found that the same was true when animals were given phenobarbital sodium or morphine.

It was observed by Dean that therapeutic reinjection of tetanus antitoxin in a soldier suffering from tetanus who had already received tetanus antitoxin some days before did not produce anaphylactic shock but that, when he recovered from the anesthetic, urticaria developed.

From this it would appear that a general anesthetic is likely to prevent or at least delay anaphylactic shock, if, during anesthesia, foreign protein is injected in a sensitized patient. It must be remembered, however, that there are great individual differences in the reactions of animals and also in man, and the apparently favorable effect of anesthesia in preventing shock should not be allowed to displace other precautionary measures which may be taken for its prevention.

TUBERCULOSIS OF CECUM

To the Editor:—1. I have a patient suffering from hyperplastic tuberculosis of the cecum with the adhesive type of tuberculous peritonitis. He has been advised to go to Arizona and wishes to know whether Prescott or Flagstaff is suitable. 2. Is there any place in the West Indies where such a patient might go? Please do not print name.

M.D., New York.

ANSWER.—1. With the pathologic condition outlined, Prescott or Flagstaff would be suitable if the patient wishes to go.

2. Places in the West Indies are not ordinarily considered satisfactory for patients with tuberculosis.

LOW BLOOD PRESSURE

To the Editor:—A man, aged 37, married, has a persistently low blood pressure, which averages about 84 systolic and 76 diastolic. He complains of feeling tired, drowsy and sleepy, and of headache, which is not confined to any particular area of the head. Physical examination does not show any evidence of endocrine disturbance or abnormality. The blood count is normal, the Wassermann reaction negative, the urine negative for albumin, sugar and casts. The eyegrounds are negative, the reflexes are normal, the gait is normal and the weight is normal for his age, height and sex. His appetite is good. He is a salesman. His past history is negative and he does not show any neurologic symptoms. His family history is negative. I have given him the usual drugs that would be expected to raise his pressure but without avail. About five months ago his blood pressure reached 104 systolic and 78 diastolic for a short time and he felt much better. In spite of continued medication, and rest, the blood pressure continued to fall until it reached the usual level and the same symptoms returned. Can you give me any idea what causes his condition, and outline a satisfactory treatment? Please omit name.

M.D., Maryland.

ANSWER.—Persistent hypotension may have little or much significance. Such a blood pressure as given for this patient seems incompatible with life. There is only 8 mm. of pulse pressure. It suggests an error in measurement. Many otherwise normal persons have persistently low blood pressure, but a pulse pressure of at least 20 mm. of mercury. It would be interesting to know what effect exercise has on the patient's pressure. With all the negative observations as listed, the condition suggests some endocrine disturbance: either hypothyroidism or hyposuprarenalism. As the basal metabolic rate is low in both these conditions, it may be difficult to differentiate them. The test should be made, however, and the treatment be guided by the result. Occasionally strychnine sulphate in doses of 3 mg. (one-twentieth grain) four times daily acts as a vasomotor tonic. One other condition should be carefully looked into: occult tuberculosis. Cod liver oil seems to help in this disease.

NEUTRALIZING FOOD IN GASTRIC ULCER

To the Editor:—In THE JOURNAL, Aug. 15, 1931, on page 436, the writer says, "Stepp makes it a practice to include fruit juices in his regimen for ulcer, neutralizing these if desirable to avoid acidity." How was that neutralizing done? That is what I wish to do for patients here, not for ulcer, however, and I wish to know the procedure.

E. L. DAVIS, M.D., Kijabe, Kenya Colony, East Africa.

ANSWER.—In Dr. Wilder's article, from which the correspondent takes his quotation, Stepp is misquoted. He did not imply that he neutralized the fruit juices but that he neutralized the gastric contents. His original statement is as follows:

Wie soll ein Ulcus des Magens oder Zwölffingerdarms zur Ausheilung kommen können, wenn der Organismus sich im Zustand des Mangels an C-Vitamin befindet! Wir haben deswegen an der Klinik ganz systematisch Versuche mit Fruchtsäften bei Ulcuskranken unternommen und Herr Gutzeit hat feststellen können, dass insbesondere Traubensäfte ganz ausgezeichnet vertragen werden, wahrend man bei Uebersäuerung des Magens mit Zitronen- und Apfelsinensaft vorsichtig sein muss. Aber hier kann man sich ja freilich durch vorsichtige Neutralisierung ohne weiteres helfen.

Translation:

How can an ulcer of the stomach or duodenum heal if the organism is in a state of vitamin C deficiency! We therefore carried out systematically in the clinic experiments with fruit juices in ulcer patients and Mr. Gutzeit was able to demonstrate that particularly grape juices are excellently supported, whereas in gastric hyperacidity one must be careful with lemon juice and orange juice. But in this condition one can help by careful neutralization alone.

HYDROFLUORIC ACID BURNS

To the Editor:—In THE JOURNAL, September 3, there was a question relative to hydrofluoric acid burns. In the past two years I have treated many hydrofluoric acid burns of varying degrees of severity. From the cases seen it has been necessary to treat these burns somewhat differently from other acid burns.

Hydrofluoric acid apparently penetrates deeper than other acids and when seen immediately after occurrence will appear trivial. However, on the second or third day these burns show a marked destruction of tissue with great depth of penetration. Unless some means is taken to prevent further progress, these burns will show further extension with surface gangrene, severe pain and extreme tardiness in healing. The hydrofluoric acid burn is also extremely painful and I have found that the patient gets most relief by using copious quantities of dilute ammonia solution followed by an ice bath. In the more severe and extensive burns when seen shortly after occurrence I have found that the subcutaneous injection of a sterile 10 per cent ammonium chloride solution also relieves pain and prevents extension. It has been my custom to debride early and extensively. In from twenty-four to forty-eight hours the areas that have come into contact with the acid will appear white and lifeless. The subcutaneous tissues will rise in blebs in various areas. In all these areas, pus was present almost as soon as the blebs appeared. I have debrided these areas extensively, removing all the white appearing surface tissue. This procedure causes the patient no pain or inconvenience. For the first few days I have kept a wet dressing of magnesium sulphate on the burn and have subsequently used dressings of a bland ointment, such as sterile petrolatum or boric acid. This procedure has relieved pain, hastened healing and reduced scarification.

E. E. EVANS, M.D., Highland, Ind.

THE AIR OF PALESTINE

To the Editor:—In Queries and Minor Notes (THE JOURNAL, August 27), Dr. Philip I. Levine of Brooklyn asked for some information regarding the air in Palestine and its advantageousness to an asthmatic patient.

As a former resident of several cities in that country, I wish to take exception to your answer.

Because of its irregular physical contour, Palestine has a varied climate at any time of the year. In such cities as Jerusalem, Mount Carmel in Haifa, or in Safed and the surrounding regions, the air is dry and clear the year round and the heat rarely enervating.

The winds off the desert carrying sand and dust are so rare as not materially to affect persons with asthma, who in my experience have been decidedly benefited, particularly those afflicted with a pollen allergy.

LEONARD H. BISKIND, M.D., Cleveland.

Council on Medical Education and Hospitals

COMING EXAMINATIONS

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Written.* Nineteen cities in the United States and Canada, Oct. 22. *General, oral and clinical.* Los Angeles, Dec. 7. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh.

ARKANSAS: *Basic Science.* Little Rock, Nov. 7. Sec., Mr. Louis E. Gebauer, 1002 Donaghey Bldg., Little Rock. *Regular.* Little Rock, Nov. 8-9. Sec., Dr. Sam J. Allbright, Searcy. *Eclectic.* Little Rock, Nov. 8. Sec., Dr. Claude E. Laws, 803½ Garrison Ave., Fort Smith. *Homeopathic.* Little Rock, Nov. 8. Sec., Dr. Allison A. Pringle, Eureka Springs.

CALIFORNIA: *Sacramento,* Oct. 17-20. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

CONNECTICUT: *Basic Science.* New Haven, Oct. 8. Prerequisite to license examination. Address, State Board of Healing Arts, 1895 Yale Station, New Haven. *Regular.* Hartford, Nov. 8-9. Sec., Dr. Thomas P. Murdock, 147 West Main St., Meriden. *Homeopathic.* New Haven, Nov. 8. Sec., Dr. Edwin C. M. Hall, 82 Grand Ave., New Haven.

FLORIDA: Jacksonville, Nov. 14-15. Sec., Dr. William M. Rowlett, 706 Franklin St., Tampa.

GEORGIA: Atlanta, Oct. 11. Joint Sec., Mr. R. C. Coleman, 111 State Capitol Bldg., Atlanta.

ILLINOIS: Chicago, Oct. 18-20. Supt. of Registration, Mr. Paul B. Johnson, Springfield.

MAINE: Portland, Nov. 8-9. Sec., Dr. Adam P. Leighton, Jr., 192 State St., Portland.

MASSACHUSETTS: Boston, Nov. 8-10. Sec., Dr. Stephen Rushmore, 144 State House, Boston.

MICHIGAN: Lansing, Oct. 11-13. Sec., Dr. Nelson McLaughlin, 1010 Maccabee Bldg., Detroit.

MINNESOTA: Minneapolis, Oct. 18-20. Sec., Dr. E. J. Engberg, 524 Lowry Medical Arts Bldg., St. Paul.

NEVADA: Carson City, Nov. 7-9. Sec., Dr. Edward E. Hamer, Carson City.

NEW JERSEY: Trenton, Oct. 18-19. Sec., Dr. James J. McGuire, 1101 Trenton Trust Bldg., Trenton.

NEW MEXICO: Santa Fe, Oct. 10-11. Sec., Dr. P. G. Cornish, Jr., 221 W. Central Ave., Albuquerque.

RHODE ISLAND: Providence, Oct. 6. Dir., Dr. Lester A. Round, 319 State Office Bldg., Providence.

SOUTH CAROLINA: Columbia, Nov. 8. Sec., Dr. A. Earle Boozer, 505 Saluda Ave., Columbia.

Kansas June Report

Dr. C. H. Ewing, secretary, Kansas Board of Medical Registration and Examination, reports the written examination held at Kansas City, June 21-22, 1932. The examination covered 10 subjects and included 100 questions. An average of 75 per cent was required to pass. Seventy candidates were examined, all of whom passed. Twenty-two physicians were licensed by reciprocity with other states and one physician was licensed by endorsement. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent
College of Medical Evangelists		(1931)	91.5
Howard University College of Medicine		(1929) (1930) 80.8, (1931) 87, 89.4	87.9,
Northwestern University Medical School		(1932)	86.5, 87.1, 88.5
University of Kansas School of Med.		(1932) 80.1, 83.5, 83.7, 83.9, 84, 84.5, 84.7, 85, 85.8, 86.4, 86.6, 86.7, 86.7, 86.8, 86.9, 87.2, 87.3, 87.4, 87.7, 87.7, 87.9, 87.9, 88, 88.2, 88.3, 88.4, 88.5, 88.5, 88.8, 88.9, 89, 89.2, 89.4, 89.7, 89.7, 89.8, 90.1, 90.1, 90.3, 90.4, 90.6, 90.8, 90.9, 91.3, 91.4	
Johns Hopkins University School of Medicine		(1932)	89.5
University of Maryland School of Medicine and College of Physicians and Surgeons		(1929)	92.2
St. Louis University School of Medicine		(1931)	89.6
Washington University School of Medicine		(1931) 92, (1932)	91.2
Creighton University School of Medicine		(1931) (1932) 85.8, 88.8, 89.7, 90.6, 91.1, 91.6	86.9,
University of Nebraska College of Med		(1932) 84.8, 85.7, 88.2,	92
Columbia University College of Phys. and Surgs		(1929)	90.3

College	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
College of Medical Evangelists		(1930)	California
University of California Medical School		(1925)	Wisconsin
University of Colorado School of Medicine		(1925)	Colorado
College of Physicians and Surgeons of Chicago		(1902)	Illinois
Loyola University School of Medicine		(1930)	Illinois
Northwestern University Medical School		(1931)	Illinois
Rush Medical College		(1930, 2)	Illinois
University of Illinois College of Medicine		(1917) (1928)	Illinois, Wisconsin
State University of Iowa College of Medicine		(1930)	Iowa
Tulane University of Louisiana School of Medicine		(1929)	Louisiana
Minneapolis College of Physicians and Surgeons		(1900)	Minnesota
Barnes Medical College, Missouri		(1899)	Texas
St. Louis University School of Medicine		(1920), (1931)	Missouri
Washington University School of Medicine		(1930)	Missouri
University of Oklahoma School of Medicine		(1929)	Oklahoma
Hahnemann Med. Coll. and Hosp. of Philadelphia		(1930)	Delaware
University of Pennsylvania School of Medicine		(1910)	N. Carolina
Marquette University School of Medicine		(1930)	Wisconsin
Western University Faculty of Medicine, Ontario		(1898)	Nebraska

College	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Jefferson Medical College of Philadelphia		(1929)	N. B. M. Ex.

Louisiana June Report

Dr. Roy B. Harrison, secretary, Louisiana State Board of Medical Examiners, reports the written and practical examination held in New Orleans, June 9-11, 1932. The examination covered 12 subjects and included 100 questions. An average of 75 per cent was required to pass. Eighty-four candidates were examined, 82 of whom passed and 2 failed. Five physicians were licensed by reciprocity with other states. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent
University of Arkansas School of Medicine		(1926)	83.2
Rush Medical College		(1931)	82.7
University of Illinois College of Medicine		(1931)	87.2*
Tulane University of Louisiana School of Medicine		(1931) (1932) 84.2, 84.6, 84.6, 84.6, 85.1, 85.3, 85.4, 85.5, 85.6, 85.8, 86.2, 86.2, 86.3, 86.3, 86.3, 86.8, 86.8, 86.9, 86.9, 86.9, 86.9, 87, 87, 87.1, 87.1, 87.2, 87.3, 87.4, 87.4, 87.5, 87.5, 87.5, 87.6, 87.6, 87.8, 87.9, 87.9, 88, 88, 88, 88, 88.2, 88.2, 88.2, 88.5, 88.5, 88.5, 88.6, 88.6, 88.7, 88.7, 89, 89, 89.1, 89.1, 89.2, 89.2, 89.3, 89.3, 89.4, 89.7, 89.7, 89.7, 89.7, 89.8, 89.8, 89.8, 90.2, 90.3, 90.5, 90.5, 90.6, 90.8	86.6,
Creighton University School of Medicine		(1931)	88.5
Baylor University College of Medicine		(1932)	86.3, 88.7
University of Virginia Department of Medicine		(1931)	88.7

College	FAILED	Year Grad.	Per Cent
Memphis Hospital Medical College		(1904)	68.5
University of Paris Faculty of Medicine		(1926)	66.9

College	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Arkansas School of Medicine		(1931)	Arkansas
Northwestern University Medical School		(1924)	Mississippi
University of Pennsylvania School of Medicine		(1927)	Penna.
Baylor University College of Medicine		(1929), (1930)	Texas

* This applicant has completed his medical course and will receive an M.D. degree on completion of an internship.

North Carolina June Report

Dr. John W. MacConnell, former secretary, North Carolina Board of Medical Examiners, reports the oral and written examination, held in Raleigh, June 20, 1932. The examination covered 16 subjects and included 70 questions. An average of 80 per cent was required to pass. Eighty-seven candidates were examined, 86 of whom passed and one failed. Fifteen physicians were licensed by endorsement of credentials. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent
Emory University School of Medicine		(1931) 83.3, (1932)	85.4
Northwestern University Medical School		(1932) 83.4,*	86.4*
Rush Medical College		(1932) 85.9,†	87.7, 89.6
State University of Iowa College of Medicine		(1932)	85.3
Tulane University of Louisiana School of Medicine		(1932)	88.4
Johns Hopkins University School of Med.		(1929) 90.6, (1932)	83.3
University of Maryland School of Medicine and College of Physicians and Surgeons		(1932) 85.1, 86.3, 86.4, 87.3,	90.1
Harvard University Medical School		(1930) (1931) 89.6, (1932) 89.9, 90.6	92.3,
Washington University School of Medicine		(1932)	85.1, 85.9
Syracuse University College of Medicine		(1932) 80.9, 84,	86.1
University and Bellevue Hospital Medical College		(1932)	87.9, 88
Duke University School of Medicine		(1932) 86.7, 87.4, 89.4,	90
Jefferson Medical College of Philadelphia		(1929) (1932) 85.9, 86.6, 86.9, 88.7, 90.4, 90.9, 91.7	83.9,
Temple University School of Med.		(1932) 86.3, 86.9, 86.9,	88.1, 88.3
University of Pennsylvania School of Medicine		(1930) (1932) 86.4, 86.9, 87, 87, 87.1, 87.7, 88.6, 89, 89.1, 89.7, 89.9, 89.9, 91, 91.3, 91.9, 93.7	91.1,
Medical College of the State of South Carolina		(1931)	83, 88.3
Meharry Medical College		(1931)	88.1
Vanderbilt University School of Medicine		(1932)	96.4
Medical College of Virginia		(1931) (1932) 81.4, 81.6, 83.1, 83.7, 84, 84.6, 85, 85.7, 86, 86.3, 86.3, 86.9, 87.1, 87.6, 88.3, 89.1, 89.4, 90.7	80.9, 81.6, 87.4,

College	FAILED	Year Grad.	Per Cent
University of Tennessee College of Medicine		(1931)	75.6

College	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
University of Georgia Medical Department		(1914)	Georgia
Rush Medical College		(1930)	Illinois
University of Louisville School of Medicine		(1929)	Kentucky
Johns Hopkins University School of Med.		(1928, 2), (1929)	Maryland
University of Maryland School of Medicine and College of Physicians and Surgeons		(1925)	N. B. M. Ex.
Washington University School of Medicine		(1929)	N. B. M. Ex.
Columbia University College of Phys. and Surgs.		(1926)	S. Carolina
University and Bellevue Hospital Medical College		(1928)	New York
Jefferson Medical College of Philadelphia		(1924), (1928)	Penna.
University of Pennsylvania School of Medicine		(1910)	Penna.
Medical College of the State of South Carolina		(1926)	S. Carolina
University of Virginia Department of Medicine		(1928)	Missouri

* These applicants have received an M.B. degree and will receive an M.D. degree on completion of an internship.

† This applicant has received a four-year certificate and will receive an M.D. degree on completion of an internship.

Book Notices

Pulmonary Tuberculosis. By Maurice Fishberg, M.D., Chief of the Tuberculosis Service, Montefiore Hospital, and of Its Country Sanatorium for Incipient Tuberculosis. Volume I: Etiology, Pathogenesis, Symptomatology, Roentgenology, Clinical Forms. Volume II: Tuberculosis in Children and in the Aged; Tuberculosis of the Pleura; Diagnosis, Complications and Prognosis; Medical, Dietetic, Climatic and Institutional Treatment; Therapeutic Pneumothorax; Surgical Treatment. Fourth edition. Cloth. Price, $15 per set. Pp. 567, with 146 illustrations; Pp. 624, with 94 illustrations. Philadelphia: Lea & Febiger, 1932.

This edition endeavors to incorporate the advances of the past ten years in the knowledge of pathogenesis, diagnosis and treatment. Information in this disease has progressed so definitely that few sections of the previous editions have failed to be left with critical revision. The author has completely rewritten several chapters and sections in the book. The chapter on the pathology and morbid anatomy of pulmonary tuberculosis is particularly valuable. Generally in American textbooks the pathologic aspects of tuberculosis have not received the adequate emphasis that they should. This has resulted in many conceptions of the disease that are at distinct variance with postmortem appearances. The author's chapter on this subject is excellent. In discussing the morphogenesis of pulmonary phthisis he covers the material under four headings: the primary lesion in the lungs, doctrines of Ranke and their evolution, the point of departure of clinical pulmonary tuberculosis, and dissemination of the tuberculous lesions in the lung. Views of authoritative investigators are carefully evaluated and summarized, and the excellent illustrations in this chapter crystallize for the reader the description of pathologic changes discussed in the text.

Among some of the recent items presented on the subjects of diagnosis and prognosis which have been of current interest in tuberculosis are erythema nodosum, epituberculosis, sedimentation tests, and the differentiation and prognostic significance of apical compared with subapical lesions and pulmonary cavities. Under treatment, critical evaluation is made of such recent regimens as B C G in prophylaxis, the Gerson salt-free diet, "Sanocrysin," and other chemotherapeutic measures. The medical aspects of phrenicotomy and extrapleural thoracoplasty are considered, and it is the author's opinion that surgical operations for pulmonary tuberculosis have proved of a certain but distinctly limited benefit in a small proportion of cases. The discussion on artificial pneumothorax has received considerable expansion and is treated in a thorough manner. The entire subject of therapy in pulmonary tuberculosis is permeated by an intelligent conservatism and developed to the point at which rational treatment is clearly presented. The author has given the reader a comprehensive summary of the various therapeutic procedures used in pulmonary tuberculosis and, in addition, a sincere evaluation of them on the basis of his vast experience.

In the discussion on the clinical aspects of pulmonary tuberculosis, several types of tuberculosis have been described which present differences in clinical course, prognosis and response to treatment. Factors determining these differences are presented and special stress is placed on early diagnosis and criteria of treatment. Because of the importance of early recognition of pulmonary tuberculosis in adults, the clinical picture of early infraclavicular infiltration is discussed in detail and the roentgen observations that are indispensable aids in early recognition are jointly considered. This is a particularly important phase of the subject and is presented in a masterly manner. A comprehensive chapter on tuberculosis in infancy and childhood and phthisis in the aged aids the reader in understanding how the factors that are inherent with the extremes of these age periods play an important part in determining the clinical course of the disease. A sharp distinction is made between tuberculous infection and tuberculous disease. The importance of the constitutional signs and symptoms are stressed on which the physician must base his decision as to whether the patient is ill and in need of treatment.

In view of the tremendous scope of this work, the author makes a few statements that are not in accord with authoritative studies of this subject. Possible exceptions may be found in Dr. Fishberg's opinion that home treatment is equal to and a little better than sanatorium treatment, that less than 5 per cent of all cases of pulmonary tuberculosis can be considered ideal for artificial pneumothorax, and that the percentage of those benefited by surgical treatment is so small. Certainly the first statement of the author will encounter much criticism from those who feel that the solution of the tuberculosis problem resolves itself in preventing contact with infected individuals under conditions, in most cases, which cannot be controlled. Pediatricians, particularly, will find it difficult to sympathize with this view, as one of the big factors in reducing the mortality of this disease in childhood is the prevention of repeated infection by some adult in the same home. The author, of course, stresses the importance of strict care if home treatment is undertaken, but the high incidence of the disease where such care is not possible leaves the author's view open to question. His opinion on artificial pneumothorax and surgical treatment is perhaps based on observations over a long period and is therefore perhaps at variance with statistics based on immediate results. The author has undoubtedly given both sides of these questions serious deliberation and, while they may conflict with those expressed by other authors, he has had the courage and sincerity to express his convictions.

This book is a noteworthy contribution to the subject of pulmonary tuberculosis. It is exhaustive in scope and yet so concise that the essential facts are readily available to the reader. Data are presented in a critical manner and carefully evaluated on the basis of present knowledge and the author's extensive experience in this field. The ubiquity of the disease is such that every one in the practice of medicine should be thoroughly familiar with the fundamental facts of tuberculous infection, its diagnosis, prevention and treatment. Much of that information is contained within these two volumes. This is the best recent book on the subject of pulmonary tuberculosis in the English language.

Ergebnisse der gesamten Tuberkuloseforschung. Herausgegeben von H. Assmann, H. Beitzke, H. Braeuning und St. Engel. Band IV. Paper. Price, 47 marks. Pp. 494, with 197 illustrations. Leipzig: Georg Thieme, 1932.

In these volumes, annually edited, certain phases of the work in tuberculosis are presented in broad critical reviews. The present volume maintains the high standard of thoroughness and completeness set by its predecessors. Dr. Arborelius of Sollefteå, Sweden, discusses tuberculosis in populations little or not tuberculized. After summarizing the literature, which is chiefly concerned with primitive tribes, he presents in detail his studies in his homeland, giving a clear picture of the clinical course of primary tuberculosis in white adults. The next two reviews are devoted to tuberculosis in the aged. Dr. Kalbfleisch of Graz presents the pathologic features which, in conjunction with the clinical studies of Dr. Kayser-Petersen of Jena, form a complete treatise on the subject, which is of particular interest on account of its diagnostic difficulties and its epidemiologic significance. Specific and nonspecific therapy, chemotherapy and pharmacologic treatments are discussed by Dr. Schröder of Schömberg. His analysis of the therapeutic use of tuberculin is welcome at this time, when tuberculin is probably all too completely discarded as a therapeutic agent The scattered literature on oleothorax is unusually well compiled and analyzed by Dr. Kremer of Belitz. His lucid discussion of indications, contraindications and physiologic action should help much to have this rather recent form of treatment adopted more frequently, though its field of usefulness is strictly limited. Another adjuvant in collapse therapy, thoracocautery, is adequately reviewed by Dr. Luedke of Sülzhayn. The longest chapter, some 110 pages, is devoted to healing processes in endothoracic tuberculosis in childhood. Dr. Nüssel of Düsseldorf has here compiled an unusually rich and interesting material, which is profusely illustrated with good roentgenograms. His involved style and his unduly elaborate classification and terminology, however, decrease lamentably the usefulness of his work. It is real—and unnecessary—labor to extract from his writing the information that it contains. The volume closes with a brief review on the topography and morphology of intrapulmonary and intraglandular calcifications by Dr. Beutel of Prague. His studies are based both on pathologic and on roentgenologic observations. These "ergebnisse" are highly recommended to any one who wishes to keep

thoroughly informed of the newer developments in tuberculosis. The illustrations are well executed, so that even finer roentgenologic details are clearly reproduced; the bibliographies are extensive and truly international; there are indexes of authors and of subject matter.

Ethics in Nursing. By Gene Harrison, A.B., R.N., Educational Director, Stamford Hospital, Stamford, Connecticut. Cloth. Price, $1.50. Pp. 163. St. Louis: C. V. Mosby Company, 1932.

This is an unimportant contribution to an important subject. In the past twenty-five years, books have been written on this subject which have been both practical and inspiring. There seems to be small reason, therefore, for adding this volume, which fails to contribute either in form or in content material of value to pupil or teacher. Although the author states that high school graduation should be the minimum requirement for entrance to a school of nursing, the manner of presenting her ideas is planned on an elementary school level. In this book she attempts first to define ethics and later to show its relation to the practice of nursing. In the definition of ethics is found the weakness inherent in the book; namely, an attitude which is pedantic and oversentimental, at the same time lacking perspective and an understanding of the psychology of students. The author dismisses lightly the problem of unemployed nurses by attributing the condition to unethical conduct of the individual, rather than recognizing it as a result of the present system, which produces, in numbers at least, a commodity for which there is not sufficient demand. This volume fails to set forth the ethical problems confronting hospitals, nurses and training schools in a manner that will command the appreciation and respect of the present-day student.

Euthanasia: A Plea for the Legalisation of Voluntary Euthanasia Under Certain Conditions. By C. Killick Millard, M.D., D.Sc. With text of proposed bill. Also an appendix containing expressions of opinion from medical men, clergymen, and others. Foreword by Sir Arbuthnot Lane, Bart, C.B., F.R.C.S. Boards. Pp. 44. London: C. W. Daniel Company, 1931.

The author proposes that any person who has reached years of discretion and is suffering from an incurable disease which usually entails a slow and painful death may have himself killed quickly and painlessly, instead of waiting for the death that threatens him. Imbeciles, mentally defective persons, monsters, and old persons who have become burdens to their relatives would not be entitled to the relief that the author proposes, nor would any one be allowed to commit suicide. Under the legislation suggested by the author, which he submits in the form of a bill, a person wanting to be killed would apply to a proper court for that privilege, submitting certificates from two medical practitioners to prove that he is suffering from an incurable disease and that the process of death is likely to be protracted and painful. The application and certificates would be referred to a "euthanasia referee," for investigation and report to the court. The court, if satisfied after a hearing that it is proper so to do under the terms of the act, would issue a permit to the applicant permitting him to be killed, and a permit to the medical practitioner whom the applicant desires to kill him, referred to by the author as a "euthanisor," authorizing the killing. The euthanisor might then proceed to kill the applicant in the presence of a witness and in accordance with rules prescribed by the minister of health, after which the euthanisor would make the proper report of what he had done. No medical practitioner, under the terms of the author's proposed legislation, would be eligible to act as a euthanisor unless licensed as such by the minister of health, and an official euthanisor would be appointed in every area.

It is not clear why, if a person wants to be killed and the law permits this to be done, the author would not permit the seeker for death to kill himself, even though he wants to do so, and thus to relieve his survivors of subsequent doubts and possible twinges of conscience as to the necessity for the death. Neither is it clear why some relative or friend of the applicant should not be permitted to kill him, if the applicant so desires. In any event the killing must be effected in accordance with rules prescribed by the minister of health, and it should certainly not be difficult to frame rules that would render death certain and painless even at the hands of a nonmedical person. The age-old function of the medical profession is to save life, not to destroy it, and certainly there would seem to be no good reason for setting the medical profession aside as a body of professional executioners under the terms of such an act as the author proposes, when there is no need for doing so. The author recognizes the difficulties with respect to insurance that would arise under the plan he proposes, particularly with reference to insurance outstanding at the time that plan first became effective. He suggests, however, that a clause be inserted in the law, to "deal with existing policies, allowing insurance societies to deduct a discount of, say, 5 per cent for, say, six weeks, from the sum assured." Policies taken out after the passage of the law would doubtless, he believes, contain "a clause agreeing to make no difference in the sum assured in case death was brought about by legalized euthanasia." Insurance problems involved, however, are hardly likely to be settled so easily.

In support of his plea for the quick and painless killing of adult human beings when threatened with slow and painful deaths, Millard points out that the lower animals, when suffering from incurable and painful diseases or hopelessly mutilated by accident, are killed as a matter of humanity. From that fact he argues that like mercy should be granted to human beings. Here he seems to fall into the pitfalls that surround argument by analogy. The lower animals are killed without their consent, because they are devoid of discretion and incapable of giving intelligent consent. To the classes of human beings, however, that are devoid of discretion and incapable of giving intelligent consent—imbeciles, mentally defective persons, monsters, and children who have not reached the years of discretion—the author would deny the privilege of easy and painless deaths, no matter how great their disabilities and their sufferings might be. Furthermore, if his argument by analogy is sound, it might well be carried a step further, and because work animals are killed when it is no longer economically profitable to keep them, it might be argued that a similar rule should be applied to human beings. Millard's plan offers no relief to men engaged in military and naval operations, among whom, possibly, except for the wise use of narcotics, might be found the most eloquent examples of slow and horribly painful deaths, since the plan makes no provision for setting up in the military branch of the government machinery to authorize killing, such as it is proposed to set up in the civil establishment.

On the whole, Millard's booklet is more effective as an appeal to sympathy than as an argument addressed to the intellect, but perhaps this is unavoidable. If we strip human life of all emotional, moral and religious relations, and reduce it to nothing more than a congeries of physicochemical reactions, there would seem to be no reason why any human life should not be destroyed that is not in some way useful to the society of which it forms a part. But we have not yet reached that state, and when we do there will still remain the difficulty of determining what human life is useful to society and what human life is not.

Reconstruction of the Biliary Tract: A Review of All the Methods That Have Been Employed. By Edmund Horgan, M.D., M.S., F.A.C.S. Cloth. Price, $4. Pp. 201, with 75 illustrations. New York: Macmillan Company, 1932.

The subject treated in this timely monograph constitutes one of the most difficult chapters in surgery. While it is true that early operations for gallstone disease have done away to a great extent with extensive pathologic states leading to fibrosis of the extrahepatic bile ducts, the popularization of cholecystectomy has added materially to the list of traumatic strictures requiring some form of reconstruction. A successful method of repair for the more serious cases has not been evolved. The particular merit of Dr. Horgan's monograph is the careful review of clinical literature dealing with the subject. The author has gone to the original sources and emphasized certain obscure points as regards priorities of certain surgical procedures. The weakness of the monograph is the absence of a critical attitude toward related methods. Two phases of the subject have not received the emphasis they merit: postmortem evidence and experimental data. A lack of familiarity with these is perhaps responsible for the author's

inability to explain the apparently unexplainable successful outcome of Verhoogen's case (p. 86). Cahen's report of a postmortem and Museneeck's experimental work contain suggestions which make Verhoogen's case quite understandable. The author likewise fails to emphasize that the crux of the entire problem of indirect anastomosis, be it fistula implantation or interposition of a tube, is the question of an adequate blood supply to the new channel. The monograph nevertheless is a pioneer in this field and contains much that is of interest.

Jenaer akademische Reden. Herausgegeben von dem jeweiligen Rektor der Universität. Heft 13: Die Entwicklung des Sehens. Von Dr. med. Walther Löhlein, ordentl. Professor der Augenheilkunde zu Jena. Rede gehalten zur Feier der akademischen Preisvertellung zu Jena am 20. Juni 1931. Paper. Pp. 30. Jena: Gustav Fischer, 1931.

It has long been the custom at Jena to celebrate annually the founding of the university by a philosophical address by the rector, who in 1931 happened to be the professor of ophthalmology. His theme was the development of vision and he traced that function from the earliest heliotropism of monocellular organisms and lowly plants through the ascending stages of vegetable and animal life to its highest development, the vision of man. During this exposition, the various corollaries of vision, such as color vision, central vision for near and for distance, visual fields, motor functions of the eye, and binocular depth perception, were briefly touched on as such function pertained to the life of the animal. He concluded that in man the visual organ had attained its highest development, although in certain animals isolated functions of the eye were differentiated to a higher degree. In proof of this he cited the enormous range of accommodation of the mud-turtle, the 170 degree visual field of the rabbit, and the extreme acuity of distance vision of the bird; but all these were developed at the expense of some other functions of the eye and in no other form of life was there the uniform all around development found in man. But certain it is that the present human eye does not represent the highest possible stage of development of the visual organ. Although it is without doubt the most important sense organ, it is undergoing a gradual change according to the necessities of gradual ever changing conditions of life. The booklet is well worth reading and in some ways is an elaboration of a similar lecture given some years ago by Treacher Collins.

Lymanhurst School for Tuberculous Children. A Report of Ten Years (1921-1931) of Activity Compiled from the Records and the Medical Staff Papers. By J. Arthur Myers, M.D., Chief, Lymanhurst Medical Staff to F. E. Harrington, M.D., Commissioner of Health, Director of Hygiene, Director of Lymanhurst, for the Board of Public Welfare and the Board of Education. Paper. Price, $1. Pp. 141, with illustrations. Minneapolis, 1932.

The first decennial report of the Lymanhurst School for Tuberculous Children is a welcome contribution to modern tuberculosis literature. It sets a worthy example for others to follow. It is not common in large cities for civic spirit and unselfishness to dominate and harmonize the efforts of several large departments in a city government with so much net profit. For this concerted effort, great credit is no doubt due to the initiative of Dr. F. E. Harrington, commissioner of health of Minneapolis, to the organization and execution of the work by Dr. J. A. Myers, and to the efforts of numerous able men and women listed on their various staffs, the personnels of which leave little to be desired. Beginning as a school for tuberculous children, the work has grown to include, as well, a large outpatient department of patients, contacts and suspects.

The tuberculosis problem in children, or the less happily chosen term "childhood type tuberculosis" (because adult types are also included), is treated fully, and many collateral studies made outside the field of tuberculosis. The methods of study, the problems undertaken and the reports made are commendatory, as well as the abstracts of the various reports given in the body of the report. From the standpoint of the printer's art, the work deserves high praise. The paper is the best, the halftones would serve well any photographic magazine, and the print is of a good readable size, clear and flawless.

Although definite history to exposure is not always easy to obtain and requires expert handling, Richdort and Hetzler reported that patients giving histories of contact reveal a positive tuberculin reaction twice as often without such a history. Magiera, in more than 2,000 patients, found of those giving a history 51.1 per cent positive, while the others were 28.6 per cent positive.

Wahlquist and Meyers' observations on infants are of extreme importance and virtually parallel similar work of Léon Bernard in France. Of 71 infants giving the positive reactions, 95.7 per cent gave a history of exposure. Of this group 40.8 per cent showed roentgenographic changes mostly in the region of the hilus, and only 8.4 per cent died. Bernard's series showed about 8 per cent fatal, about 16 per cent of actual disease, while about 75 per cent presented no clinical symptoms whatever, a remarkably close parallel. The authors well say that "the prognosis of simple tuberculous infection in infants is not as grave as it was formerly thought." Kernkamp made similar observations in a larger series. She considered the tuberculin reaction, the roentgen examination and the history of exposure the most important diagnostically. Treatment includes removal from the infection, comfort, rest, proper diet for age, and heliotherapy. For prevention, "tl.e prevention of exposure to tubercle bacilli" is the most important.

Lodmell's study on primary lesions is in keeping with other authors as to location, although it must be remembered that roentgenograms reveal only about half the actual numbers of primary foci present and that many primary foci cannot be found except microscopically. Some may be truly extrapulmonary, as he suggests.

In their community about half the children were tuberculin positive. Among 1,412 cases, 45 per cent gave positive Pirquet reactions. Of 232 children showing evidence of primary foci, 152 gave a history of exposure, while only 45 reacted positively to the Pirquet test. The healed foci, therefore, show less tendency to react than those showing active or healing foci, indicating a gradual disappearance of the sensitization as healing progresses. If large doses of tuberculin were used, however, the number of positives would no doubt increase. The authors recognized this fault later in their work and recommendations have been made accordingly. In all, 256 patients turned positive while only two turned negative from positive. Leggett and Hutchinson's belief that many primary lesions heal without leaving a trace of infection is interesting.

Anderson found that the lymph nodes are nearly always enlarged, especially the cervical, but the enlargement was thought to be mostly nonspecific. Tsiang reported on the unreliability of the d'Espine sign for hilus node enlargement either as a specific sign or of diagnostic value otherwise.

The epidemiologic studies reveal anew that contact is the one link that binds tuberculosis to the human race.

The study of 100 patients coming in with far advanced tuberculosis is worthy of reporting because it shows the fallibility of general practitioners with regard to tuberculosis. Thirty-one per cent had not consulted a physician; 27 per cent of the cases had been diagnosed in one way or another but had not been reported; 42 per cent were diagnosed something else first. Nine per cent of all deaths in Minneapolis in 1929, from tuberculosis, were from supposedly "arrested" cases. The recommendation is made that so-called arrested cases be followed more closely.

Interesting studies have been made on tuberculous pleurisy, bones, joints and other forms of extrapulmonary tuberculosis; but the crowning achievement is the serial examinations made by Myers and his associates on the pulmonary lesions of tuberculous children. They have proved what many have suspected, that the first infections are commonly accompanied by widespread inflammatory exudation, which usually clears, leaving a relatively small central caseous focus, which undergoes regressive changes over a period of years to leave the "Ghon focus." They rightly emphasize that such terms as "epituberculosis" and "juvenile tuberculosis" should be dropped from use.

It is important to note that, of the fifty-nine "adult types," most of them showed a relationship to the childhood type. Most adult type infections are, therefore, apparently reinfections from within and belong to a continuation of the primary.

The authors state that at the beginning of the work the clinical examination was placed first in importance but that as they gained more experience it was found to be of the least value. The big triad is history of contact, a positive tuber-

culin test and positive roentgenographic observations. Even tubercle bacilli are not often found in the sputum of the childhood type. Other body fluids, however, such as the gastric contents and the feces, should be studied. They are inclined to believe that classification should be largely on a basis of the tuberculin reaction; viz., (1) tuberculin negative, (2) tuberculin positive, and (3) the adult type of disease. They feel that any tuberculin positive patient is a potential tuberculous patient. This may be true, but there are many who will not agree with this, without qualification, as a practical means of handling the problem, especially in communities where the positive reactors are in the majority. They justly say, however, that one has no right at present to give a roentgenographic diagnosis of a healed tuberculous lesion in a child, because calcification is frequently surrounded by caseation. As a result of their experience they recommend, in brief, that the work go on; that the intracutaneous (Mantoux) test be considered standard and used to rule out infection because of its high specificity when properly done; that complete roentgen studies be made on all parts of the body of the tuberculin positive cases; that careful histories be taken of every case in attempt to rule out a contact; that physical examination be made with full realization of its limitations; that complete laboratory studies be made of all body secretions, excretions and purulent exudates; that every positive tuberculin reaction in a child be considered a first infection and the child potentially tuberculous, and that all nonprogressive cases be considered latent. Outside of a pathologic check on their work and a few controversial points about the classification of the disease in childhood, the work is as complete as can be hoped for and contains valuable information on tuberculosis of childhood.

Précis d'hygiène. Par Jules Courmont, professeur d'hygiène à la Faculté de médecine de Lyon, avec la collaboration des Pr Ch. Lesieur et Dr A. Rochaix. Fourth edition revised by Paul Courmont, professeur de clinique et prophylaxie de la tuberculose à la Faculté de médecine de Lyon, et A. Rochaix, professeur d'hygiène à la Faculté de médecine de Lyon. Cloth. Price, 80 francs. Pp. 956, with 225 illustrations. Paris: Masson & Cie, 1932.

This book retains the clarity and precision of statement that have made previous editions successful. American readers, however, will find the treatment of a few topics conventional and inadequate. This is notably true of the brief discussion of vitamins. Too much significance is attached to methods of room disinfection, too little to milk pasteurization and water chlorination. Minor blemishes might be pointed out, but the book as a whole will doubtless continue to be serviceable for French students and social workers.

Human Sterilization: The History of the Sexual Sterilization Movement. By J. H. Landman, Ph.D., J.D., J.S.D., the College of the City of New York. Cloth. Price, $4. Pp. 341, with illustrations. New York: Macmillan Company, 1932.

"What the question of cacogenicity, which is the crux of the entire problem of sterilization, requires," says the author, "is more science than propaganda, and more research than speculation." He offers his book as "a scholarly and scientific treatment of the available data on the subject," utterly devoid of propaganda, and indulging in speculation only as science indulges in speculation, with the injunction, "The conclusions are not final but suggestive." The author's interest in the problem of human sterilization began with the decision of the United States Supreme Court in *Buck* v. *Bell* (47 Sup. Ct. Rep., 584, 274 U. S. 200), in 1927, upholding the Virginia sterilization law, when he questioned not the legality but the eugenic, social and therapeutic values of such legislation. Obviously his interest has not waned since that time and has been well directed in productive channels, for otherwise he could not have produced such a volume as this. He has condensed into so little space a study that is so comprehensive and yet so packed with detail as to defy any effort that might be made within present limits to give a fair summary of its contents. It must suffice to state the main headings under which human sterilization is discussed. Under "Eugenics and Social Legislation," the author reviews the eugenics movement, statistics of mentally incompetent people, and the history of human sterilization in the United States. The present legal status of our human sterilization laws and three noteworthy court decisions relative to compulsory human sterilization are considered under "Human Sterilization and the Courts." The section of the book devoted to "The Biology of Human Sterilization" covers heredity and human sterilization, the nature of our socially inadequate people, the heredity of psychotic traits, and the inheritance of mental deficiency, and contains a critical examination of eugenics. In the following section, entitled "The Surgery of Human Sterilization," the author discusses the human sterilization operations, the effects of human sterilization, and types of human sterilization operations authorized by law. The text of the book then concludes with a discussion of human sterilization and social policy, considering who shall be sterilized and the problems in the administration of human sterilization laws. Exhaustive analyses of the history, content and administration of human sterilization laws in the United States are included in an appendix covering twenty-seven pages, which is followed by a bibliography covering fifteen pages. The book is exhaustively documented throughout.

This book cannot be too highly recommended to any one who desires to have at hand in a convenient form the best available information concerning human sterilization and laws in this country relating to human sterilization, with a calm, dispassionate, unbiased discussion of the subject from biologic, social and legal points of view.

California's Medical Story. By Henry Harris, M.D., Associate Clinical Professor of Medicine, University of California. With an introduction by Charles Singer, M.D., D.Litt., University of London, London, England. Boards. Price, $7. Pp. 421, with 28 illustrations. San Francisco: J. W. Stacey, Inc., 1932.

One hardly realizes how really young California is. In 1845, less than a hundred years ago, it was a frontier outpost of the Spanish people in North America, practically inaccessible except by months-long journeys by sea that had real hazard. It represented, almost within the memory of men now living, primitive civilization influenced but hardly controlled by Spanish or Spanish-American political or religious adventurers, with the infiltration of a few Americans, English and Scotch and others of non-Spanish origin. Beginning with a brief chapter on Indian medicine, Dr. Harris makes the best of the Spanish and Mexican and early American period. The doctors of this period were for the most part doctors by avocation; they had an important place in the political and social history of the country, and the story of them and their activities is a fascinating chapter. Then comes the military occupation, the discovery of gold and the gold fever, and the sometimes lurid but sometimes somber story of the doctors of this time. This is followed by the familiar story of the gradual development of medicine in California after 1850, as it has been seen in other parts of the United States. But even this period has its own peculiar interest that comes out of the strong and vigorous qualities of that unique state. Harris has scholarship, an alert sense of human interest and a vivid style; he had an interesting story and has told it well. It is absorbing both as a recital of an interesting phase of California's general history and as a history of California medicine. The work is a contribution of value to the history of American medicine.

Reports of the Committee Upon the Physiology of Hearing: I. Studies in the Localization of Sound. A. The Localization of Sounds in the Median Plane. By J. H. Shaxby and F. H. Gage. B. Some Factors in Auditory Localization. By H. E. O. James and Marion E. Massey. Medical Research Council, Special Report Series, No. 166. Paper. Price, 1s. Pp. 51, with illustrations. London: His Majesty's Stationery Office, 1932.

This monograph presents careful scientific experimental work relating to the localization of sound. The authors emphasize the importance of the time element and the phase differences for the determination of the localization of sound. The treatise is a technical one, in which considerable mathematics is employed. From a practical standpoint this work is perhaps of greater importance in the defense services of a country, as in the management of aircraft and submarines, than it is in the practice of otology. Nevertheless it is desirable to know something of the scientific application of certain principles and interesting subject matter, even though they do not have an especially important bearing on otology as such. The style of the report is clear and characteristic of the scientific writings of English scientists in that essential facts are logically and concisely expressed.

Medicolegal

Implied Consent to Operations Incident to Principal Operation

(Higley v. Jeffrey (Wyo.), 8 P. (2d) 96)

In the course of an abdominal operation, a surgical needle disappeared. After a search for it lasting twenty minutes, the abdominal incision was sewed up. The patient's husband, who was in the hospital at the time, was told that the patient was all right, and it was suggested that he go to luncheon, which he did. During his absence, the patient was taken to another room, where a roentgenogram was made, showing the needle in the pelvic cavity. The patient was taken back to the operating room and further anesthetized, the incision was opened, the needle was easily removed, and the wound was closed. The patient died on the second day after the operation, from pulmonary embolism. The husband of the dead patient thereupon sued the physician who had operated. From a judgment in favor of the physician, the husband appealed to the Supreme Court of Wyoming. He contended that the reopening of the incision was a second operation; that the physician had no authority to perform such an operation, except perhaps in an emergency which threatened the patient's life; that there was no such emergency in this case, and that the second operation was the proximate cause of his wife's death. He objected to an instruction given by the trial court, making it impossible for the jury to find a verdict in his favor unless it found that the acts of the physician of which the husband complained were not performed by the physician as a part of his duty to render such services as were to the best interests of the patient.

It is undoubtedly the rule, said the Supreme Court, that in the absence of an emergency a surgical operation cannot be performed without the consent of the patient or of some one authorized to speak on his behalf, and it has been held that authority to perform one operation does not confer authority to perform a second operation. The question in this case, however, as viewed by the Supreme Court, was whether the reopening of the closed abdominal incision and the removal of the needle would be considered in law a second operation, to which the patient and her husband, the plaintiff, had not consented, or would be considered as incidental to the operation to which they had admittedly given consent.

That the authority of a physician incidental to an operation should not be too narrowly construed is indicated by some of the decided cases. In the leading case, *Mohr* v. *Williams*, 95 Minn. 261, 104 N. W. 12, the Supreme Court of Minnesota laid down the rule that "if, in the course of an operation to which the patient consented, the physician should discover conditions not anticipated before the operation was commenced, and which, if not removed, would endanger the life or health of the patient, he would, though no express consent was obtained or given, be justified in extending the operation to remove and overcome them." In *Harrison* v. *Reed*, 21 Ohio N. P. (N. S.) 206, a patient submitted to an operation which was expected to require only one incision. In the course of the operation, however, a second incision had to be made. The superior court of Cincinnati said:

> If having her consent to make the lower incision, and to perform the lower operation with the understanding that this was all that was to be done, and that no other incision or operation was required, nevertheless, if the defendant found on opening plaintiff's abdomen by the lower incision that another incision was necessary to reach and alleviate the ailments and disorders of the colon elsewhere, as evidenced by the symptoms and conditions of her abdomen as shown at that time and the defendant, having therefore made this upper incision and located the seat of and remedied the ailment and disorders as indicated by these other symptoms, the consent of this plaintiff to the making of such other upper incision and to the performance of such other upper operation will be implied in law.

In *Pratt* v. *Davis*, 224 Ill. 300, 79 N. E. 562, the Supreme Court of Illinois laid down the following rule:

> Emergencies arise, and when a surgeon is called it is sometimes found that some action must be taken immediately for the preservation of the life or health of the patient, where it is impracticable to obtain the consent of the ailing or injured one or of any one authorized to speak for him. In such event, the surgeon may lawfully, and it is his duty to perform such operation as good surgery demands, without such consent.

The rule implicit in these decisions is that unexpected conditions encountered in the course of an operation must, generally at least, be met according to the best judgment and skill of the operating physician. In the present case, when it was discovered that the needle might be in the body of the patient she was entitled to that treatment at the hands of the defendant physician that conformed to the requirements of due care, diligence and skill. She was unconscious and could not determine what should be done. The plaintiff, her husband, does not claim that if he himself had been consulted he would have refused his consent to the reopening of the abdomen, and it may be questioned whether, if he had done so, it would not even yet have been the duty of the operating physician to do whatever ordinary prudence, care and skill demanded in the best interest of the patient. See *State* v. *Housekeeper*, 70 Md. 162, 16 A. 382. There can be no doubt that the physician must remove from the body of his patient all foreign bodies that have been introduced into it, except such as are left there for a proper and intended purpose. Removal of such bodies has been held to be a part of an operation. See *Palmer* v. *Humiston*, 87 Ohio St. 401, 101 N. E. 283; *Barnett's Adm'r* v. *Brand*, 165 Ky. 616, 177 S. W. 461.

It cannot be said in the present case, said the Supreme Court, that to reopen the abdominal incision in order to remove the needle left in the abdomen was a separate and an independent operation. The allegation of negligence in losing the needle in the abdomen, which was made in the course of the trial, was not pressed in the appeal to the Supreme Court and therefore was not before the court in making the decision. The judgment of the court below in favor of the defendant physician was affirmed.

(NOTE.—The right of a physician to perform an auxiliary operation without the consent of the patient, supplemental to the principal operation to which the patient has consented, was denied by the Supreme Court of Michigan in *Franklyn* v. *Peabody* (Mich.), 228 N. W. 681, abstracted in THE JOURNAL, Aug. 9, 1930, page 436.

Society Proceedings

COMING MEETINGS

American Academy of Physical Therapy, Philadelphia, October 12-14. Dr. Arthur H. Ring, 163 Hillside Avenue, Arlington, Mass., Secretary.

American Association of Railway Surgeons, Chicago, November 2-4. Dr. Louis J. Mitchell, 29 East Madison Street, Chicago, Secretary.

American College of Surgeons, St. Louis, October 17-21. Dr. Franklin H. Martin, 40 East Erie Street, Chicago, Director-General.

American Public Health Association, Washington, D. C., October 24-27. Dr. Kendall Emerson, 450 Seventh Avenue, New York, Acting Executive Secretary.

American Society for the Study of Disorders of Speech, St. Louis, November 25-26. Dr. Samuel D. Robbins, 419 Boylston Street, Boston, Secretary.

American Society of Tropical Medicine, Birmingham, Ala., November 16-18. Dr. Henry E. Meleney, Vanderbilt University School of Medicine, Nashville, Tenn., Secretary.

Associated Anesthetists of the United States and Canada, New York, October 17-21. Dr. F. H. McMechan, 318 Hotel Westlake, Rocky River, Ohio, Secretary.

Association of Military Surgeons of the United States, Hartford, Conn., October 20-22. Dr. J. R. Kean, Army Medical Museum, Washington, D. C., Secretary.

Central States Pediatric Society, Kansas City, Mo., October 7-8. Dr. A. H. Parmelee, 310 South Michigan Boulevard, Chicago, Secretary.

Clinical Orthopedic Society, Chicago, November 10-12. Dr. E. B. Mumford, Chamber of Commerce Building, Indianapolis, Secretary.

Inter-State Postgraduate Medical Association of North America, Indianapolis, October 24-28. Dr. W. B. Peck, 12½ East Stephenson Street, Freeport, Ill., Managing Director.

Kansas City Southwest Clinical Society, Kansas City, Mo., October 3-8. Dr. Joseph E. Welker, 906 Grand Avenue, Kansas City, Mo., Sec'y.

Kentucky State Medical Association, Louisville, October 3-6. Dr. A. T. McCormack, 532 West Main Street, Louisville, Secretary.

Pacific Association of Railway Surgeons, El Paso, Texas, October 7-8. Dr. W. T. Cummins, Southern Pacific General Hospital, San Francisco, Secretary.

Pennsylvania, Medical Society of the State of, Pittsburgh, October 3-6. Dr. Walter F. Donaldson, 500 Penn Avenue, Pittsburgh, Secretary.

Southern Medical Association, Birmingham, Ala., November 16-18. Mr. C. P. Loranz, Empire Building, Birmingham, Secretary.

Vermont State Medical Society, Burlington, October 6-7. Dr. William G. Ricker, 31 Main Street, St. Johnsbury, Secretary.

Virginia, Medical Society of, Richmond, November 1-3. Miss Agnes V. Edwards, 1200 East Clay Street, Richmond, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL in continental United States and Canada for a period of three days. Issues of periodicals are kept on file for a period of five years only. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending, but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Clinical Pathology, Baltimore

2: 277-360 (July) 1932

*Phosphates in Sugar Tolerance Test. D. R. McCullagh and Louise van Alstine, Cleveland.—p. 277.
*Clinical Evaluation of Blood Phosphate and Sugar Tolerance Curves. F. W. Hartman and D. P. Foster, Detroit.—p. 289.
Pathogenesis of Tuberculous Hemoptysis. E. Bogen, Olive View, Calif. —p. 299.
A Tyndallmeter-Colorimeter for Biologic Use and Some Applications to Turbidimetric and Colorimetric Measurements in Medicine. H. W. Sulkowitch, Baltimore.—p. 309.
Should Precipitation Test for Syphilis Be Adopted to Exclusion of Complement-Fixation Procedures? B. S. Levine, Chicago.—p. 319.
Value of H and O Agglutination in Diagnosis of Typhoid. E. E. Ecker and M. M. O'Neal, Cleveland.—p. 335.
Serodiagnosis of Malignant Disease. J. L. Landau and W. M. German, Grand Rapids, Mich.—p. 343.
Tenth-Normal Hydrochloric Acid as Diluent for Counting Leukocytes After Infusion of Solution of Acacia. M. A. Walker, Rochester, Minn. —p. 347.
Inexpensive Ocular Ruler to Facilitate Reticulocyte Counting. F. M. Johns, New Orleans.—p. 351.

Phosphates in Sugar Tolerance Test.—McCullagh and van Alstine describe experiments in which they noted that the phosphate changes in the blood of normal individuals after the administration of dextrose show considerable regularity. The changes in blood phosphate after the administration of dextrose to patients with metabolic disorders frequently differ from the changes in blood phosphate in normal individuals. It is impossible to make a definite differential diagnosis in various metabolic disorders by means of the phosphate curve.

Clinical Evaluation of Blood Phosphate and Sugar Tolerance Curves.—Hartman and Foster took 500 combined dextrose tolerance and phosphate curves on patients considered as potentially diabetic. One hundred were from individuals from 25 to 100 pounds (11.8 to 45.5 Kg.) overweight. These showed an increased rise of the blood dextrose with slow fall, while the inorganic phosphates decreased moderately with slow recovery. One hundred and two combined dextrose tolerance and phosphate curves from individuals normal in weight or undernourished showed high elevation of the dextrose curve with gradual return to the fasting level, while the phosphate curve showed only slight depression with slight recovery. Twenty-five combined dextrose tolerance and phosphate curves on persons with mild or moderate diabetes showed typical diminished dextrose tolerance curves. The phosphate curves showed slight and continued depression. On the basis of their observations the authors conclude that the curve of inorganic phosphates is a valuable supplement to the dextrose tolerance curve in the diagnosis of abnormal carbohydrate metabolism.

American Journal of Public Health, New York

22: 691-794 (July) 1932

Interpretation of Laboratory Findings in Rural Spring Water Supplies. E. K. Kline and N. M. Fuller, Olean, N. Y.—p. 691.
Getting Public Health Needs Across to Appropriating Bodies by Municipal Health Department. H. F. Vaughan, Detroit.—p. 700.
Training in Administrative Procedures of Personnel for Child Health Work. J. A. Ferrell, New York.—p. 705.
Incidence of Subclinical Mastitis. G. J. Hucker, Geneva, N. Y.—p. 710.
Postgraduate Study in Child Hygiene in United States and Canada. R. M. Smith, Boston.—p. 715.
Food Poisoning Due to Toxic Substances Formed by Strains of Cloacae-Aerogenes Group. Ruth Gilbert, Marion B. Coleman and Alice B. Laviano, Albany, N. Y.—p. 721.
Interchamber Health Conservation Contest. C. W. Gold.—p. 727.
Effect of Variations in Temperature in 37 C. Incubators on Bacterial Counts from Milk. R. S. Breed and C. S. Pederson, Geneva, N. Y. —p. 745.
Examination of Milk for Streptococci of Mastitis. C. S. Bryan, East Lansing, Mich.—p. 749.

American Journal of Syphilis, St. Louis

16: 289-427 (July) 1932

*Treatment of Cardiovascular Syphilis. H. H. Hazen, Washington, D. C.—p. 289.
*Syphilis and Trauma, with Especial Reference to Tarnowsky Test. S. S. Greenbaum and B. Madden, Philadelphia.—p. 297.
Incidence of Syphilis in Private Practice Among Negroes. W. R. R. Granger, Brooklyn.—p. 303.
Syphilitic Acute Anterior Poliomyelitis: Report of Case with Review of Literature. W. W. Chrisman, Macon, Ga.—p. 308.
Herpes Zoster and Polyneuritis Following Administration of Bismuth. S. W. Becker, Chicago.—p. 313.
Systemic Reaction to Bismarsen. A. G. Schoch, Dallas, Texas.—p. 319.
*Cistern Puncture: General Review and Comparison Between Direct and Indirect Methods. G. D. Astrachan, New York.—p. 321.
Cerebral Penetration of Bismuth: Experimental Results with Iodobismuthite, Iodobismitol and Some Other Bismuth Products. P. J. Hanzlik and Jean B. Spaulding, San Francisco.—p. 335.
Cerebral and Spinal Fluid Penetration of Bismuth: Clinical Results with Iodobismuthite (Iodobismitol) and Some Other Bismuth Products. P. J. Hanzlik, H. G. Mehrtens and Jean B. Spaulding, San Francisco.—p. 350.
Anionic Bismuth Therapy in Neurosyphilis. H. G. Mehrtens and P. S. Pouppirt, San Francisco.—p. 373.
Kahn Test Applied to Spinal Fluids. M. B. Kurtz and N. W. Larkum, Lansing, Mich.—p. 377.
Kahn Reaction in Group of Nonsyphilitic Pregnant Women. J. C. Willett and N. Nagle, St. Louis.—p. 383.
Study of Kolmer-Wassermann, Kahn and Kline Tests. Lucy S. Heathman and Margaret Higginbotham, Minneapolis.—p. 385.
Preparation of a Standard for Comparing and Reading Strength of Wassermann Reaction. G. Ginsburg, Philadelphia.—p. 393.
Wassermann Test as an Index in Treated Case of Syphilis. B. Markowitz, Bloomington, Ill.—p. 395.
Effect of Ingestion of Alcohol on Wassermann, Kahn and Hinton Tests. J. W. Brittingham and S. F. Rosen, Augusta, Ga.—p. 403.

Treatment of Cardiovascular Syphilis.—In a review of the literature on the treatment of cardiovascular syphilis, Hazen emphasizes certain points raised by the various authors. All are in accord that all cases must have proper general medication; if there is the suspicion, or presence, of congestive failure, the essential thing is rest in bed in Fowler's position, with a diet low in bulk and minerals in which the fluid and salt are kept at a minimum. Heart stimulation must be correctly employed, and diuretics used when necessary. A sedative should always be employed in a patient who is restless. On discharge from the hospital there must be a suitable rest period. The patient must be carefully studied from several angles: First, the electrocardiograph must be used to determine the presence or absence of changes suggestive of coronary involvement; second, the status of the patient as regards heavy work should be known, for a cardiac breakdown in a laborer is not as dangerous as one in a person of sedentary habits; third, the amount of previous treatment should be known. Wile emphasized his belief that a patient whose antisyphilitic treatment has been adequate and whose heart condition is asymptomatic should not receive further therapy. Treated patients who show signs of congestive failure should receive no antisyphilitic medication. Inadequately treated patients with asymptomatic cardiac lesions should be treated with the heavy metals or with tryparsamide. Untreated patients who have symptomatic heart lesions should be treated after the period of congestive failure is ended. All authors are agreed that any course of treatment should be begun with preparations of mercury or bismuth or possibly the iodides. This is to prevent the possibility of a Herxheimer reaction, or a "therapeutic paradox." Wile alone believes in using tryparsamide, while practically all other authors recommend small doses of neoarsphenamine at a later date. Likewise it is agreed that in cases of congestive failure there should be no antisyphilitic medication until compensation is reestablished. In coronary disease, arsphenamine should not be employed. In case of chronic myocarditis the reports are divergent, but on the whole they favor the employment of the metals rather than of the arsenicals. With regard to the effects of therapy there is marked discrepancy, much of which is doubtless due to varying standards of antisyphilitic medication employed.

Syphilis and Trauma.—Greenbaum and Madden call attention to the fact that, in 1877, Tarnowsky improvised a cutaneous test for the diagnosis of syphilis. It consisted in the application of a caustic paste (Ricord paste, sulphuric acid and powdered charcoal) to the skin of the patient suspected of having syphilis, with the idea of producing syphilitic phenomena through irritation of the skin, as based on the suppo-

sition that, in patients with syphilis, syphilitic lesions are much more apt to develop in those areas which have undergone some irritation. Tarnowsky's test, or cauterizatio provocatoria, as he termed it, was considered positive if characteristic syphilitic lesions developed at the site of cauterization. The authors produced blebs by means of solidified carbon dioxide in the skins of a series of patients with acute and chronic syphilis. In none of these blebs induced in the nineteen patients studied was Spirochaeta pallida found either on dark field examination of the bleb fluid, made in some over a period of two weeks, or following intratesticular inoculation of a primary and a secondary series of rabbits with the bleb fluid. Even the gumma-like ulcers that developed in some of the patients failed to show Spirochaeta pallida on repeated examination. It would seem from this series of experiments that Spirochaeta pallida is not directly concerned in the production of a syphilitic response to trauma.

Cistern Puncture. — Astrachan considers that the direct method of doing cisternal punctures is simpler for the operator and more satisfactory to the patients than the indirect one. When performed by a careful operator, who takes into consideration all the rules and contraindications, the former method is as safe as the latter. The author prefers the direct method for the beginner, who later on, when he gains some experience, may use both methods. The cisternal puncture is useful in general medicine and is invaluable for the diagnosis of cerebrospinal syphilis.

Annals of Internal Medicine, Ann Arbor, Mich.

6: 1-166 (July) 1932

*Rôle of Specific Carbohydrates in Pneumococcus Infection and Immunity. O. T. Avery, New York.—p. 1.

Presentation of John Phillips Memorial Prize. S. M. White.—p. 10.

*Physical and Physiologic Aspects of Arteriosclerosis and Hypertension. C. J. Wiggers, Cleveland.—p. 12.

Essential (Primary) Hypertension: Clinical and Morphologic Study of Three Hundred and Seventy-Five Cases. F. D. Murphy, J. Grill, B. Pessin and Gail F. Moxon, Milwaukee.—p. 31.

*Hypertension: Study of Two Hundred and Two Cases Followed for an Average of Ten Years; with Remarks on Causes and Treatment. J. M. Blackford and J. N. Wilkinson, Seattle.—p. 54.

Thallium Poisoning: Report of Three Cases. J. Lehman and L. Gaffney, Cleveland.—p. 60.

Newer Aspects in Paradentosis (Pyorrhea). H. Becks, San Francisco. —p. 65.

Report of Case of Early Hodgkin's Disease Secondarily Infected with Strain of Pathogenic Monilia. S. R. Haythorn, G. H. Robinson and L. Johnson, Pittsburgh.—p. 72.

*Spotted Fever Immunization: Results and Recommendations. N. Toomey, Palmyra, Mo.—p. 82.

Gastric Secretion: The Electrolytes Before and Their Changes at Various Periods After Histamine Stimulation. L. Martin, M. Morganstern and M. L. Carroll, Baltimore.—p. 91.

First Aphorism of Hippocrates. G. Dock, Pasadena, Calif.—p. 129.

Rôle of Specific Carbohydrates in Pneumococcus Infection and Immunity. — Avery states that the type-specific capsular substances of pneumococcus have been found in each instance to belong to the class of sugar-like substances; namely, the carbohydrates. No matter from what type of pneumococcus these specific substances are recovered, they all possess in common the chemical properties of complex sugars —the polysaccharides. But the capsular polysaccharide derived from each specific type or organism is chemically distinct, each possessing unique chemical properties which serve to differentiate it sharply from the others. Moreover, solutions of these capsular polysaccharides in chemically purified form exhibit immunologically the same specificity as do the bacteria of which they originally formed a part. Knowledge of the chemical nature and significance of the capsular polysaccharides in pneumococcus infection and immunity led the author to search for enzymes capable of decomposing these specific carbohydrates. A number of enzymes of animal and plant origin as well as cultures of various bacteria, yeasts, molds and soil actinomycetes, many of which were known to decompose cellulose and other complex carbohydrates, were tested without success. From peat soil a bacillus was isolated which possesses an enzyme that acts specifically on the capsular polysaccharide of type III pneumococcus. From these bacilli the active enzyme was extracted in soluble form. By technical procedures, active preparations of the enzyme were purified and concentrated without appreciable loss in potency. The active enzyme represents a specific agent which by itself is neither bactericidal nor bacteriolytic but which, by decomposing the capsular structure, completely alters the biologic behavior of the bacterial cell. In view of these observations, experiments were carried out to determine whether the enzyme would favorably influence the course of experimental infection in mice with type III pneumococcus. It was found that a single injection of an active preparation of enzyme protected mice against infection with a million times the number of virulent organisms invariably fatal in the untreated animals. The protective action of the enzyme is type-specific; just as in the test tube it decomposes only the type III polysaccharide, so in the animal body it is effective only against infection with type III pneumococcus. The experimental results support the view that the primary action of the enzyme lies in its capacity to decompose the capsular polysaccharide of the invading pneumococci. The process of decapsulation brought about by the direct action of the enzyme strips the bacteria of their capsular defense and thereby exposes their unprotected bodies to direct attack by the phagocytes of the host. Thus phagocytosis, ineffective against the encapsulated forms, now becomes the important mechanism in the final destruction of organisms from which the capsular substance has been removed by the action of the enzyme.

Arteriosclerosis and Hypertension.—According to Wiggers, the indiscriminate use of vasodilating drugs to lower blood pressures in hypertension is undesirable. Their effect on blood flow through an organ is always the resultant of two actions; viz., the local changes in caliber of vessels and the degree to which pressure is lowered in the aorta. Now it is a fact that vasodilator drugs without exception act predominantly on those arterioles that possess the greatest number of muscle fibers. For example, they affect vessels of abdominal organs more than vessels of the heart and brain; hence the flow through the latter is determined by the changes in aortic pressure rather than by local variations in caliber. The author has repeatedly demonstrated experimentally, for example, that amyl nitrite, contrary to general belief, reduces the flow of blood through the coronary and cerebral vessels. Obviously, such lowering of blood pressure defeats the purpose of natural compensatory mechanisms and at times may actually be dangerous. There can be no doubt that the patient with great hypertension is confronted with certain risks, such as rupture of blood vessels or decompensation of the heart. But physiologic considerations suggest that in attempting to avoid these dangers the wise physician will consider carefully whether an even greater risk is not incurred through the use of drugs that lower systemic pressures generally.

Hypertension. — Blackford and Wilkinson point out that hypertension is twice as frequently found in women as in men. The mortality rate after ten years is twice greater in men. Hypertension results from a constitutional hypertonicity of the autonomic neurovascular control in the large majority of instances and is a compensatory angiospasm in the others. Treatment of uncomplicated hypertension is a matter of mental and physical hygiene rather than of drugs. Treatment of late results of hypertension requires skilful use of medical and physical measures, added to psychotherapeutic measures.

Spotted Fever Immunization.—Toomey calls attention to the fact that six years' experience with the Spencer-Parker spotted fever vaccine, a chemically attenuated form of the virus, has demonstrated, by several controlled experiments, that it is of great value in preventing the occurrence of the mild type of spotted fever and in mitigating the severity of the highly fatal type of the disease, the mortality of the latter being reduced from the twelve year average of 85 per cent to approximately 10 per cent (9 to 12 per cent). As the protective action of the vaccine lasts only one season (from four to twelve months), annual reinoculations are necessary before the commencement of each tick season. Since the introduction of the vaccine in 1925 to the year 1931, inclusive, between 25,000 and 30,000 persons have been vaccinated, and many of them revaccinated annually from two to six times. While it is recognized that tick destruction and rodent control measures cannot be safely diminished on account of the introduction of the vaccine, it is of great importance that the vaccine be used systematically in all endemic areas, as in most areas it is the only dependable and feasible preventive measure available.

Archives of Dermatology and Syphilology, Chicago

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*Blood Sugar Metabolism in Certain Dermatoses. A. Strickler and P. D. Adams, Philadelphia.—p. 1.
Cholesterol Metabolism in Certain Dermatoses. A. Strickler and P. D. Adams, Philadelphia.—p. 11.
Capillary Permeability in Disorders of Skin. T. Cornbleet and R. I. Klein, Chicago.—p. 21.
*Bacteriology of Intestine and Blood in Psoriasis. J. C. Torrey and H. J. Schwartz, New York.—p. 27.
Persistent Infection of Tongue Due to Monilia Bronchialis. Rachel E. Hoffstadt and H. Wheelon, Seattle.—p. 40.
Exfoliative Dermatitis from Butesin Picrate Ointment. E. C. Fox, Dallas, Texas.—p. 44.
*Treatment for Lichen Planus with Intramuscular Injections of Bismuth Salicylate in Oil. H. D. Grossman, Chicago.—p. 46.
Cholesterol and Lecithin Studies of Skin Diseases. I. Rosen and Frances Krasnow, New York.—p. 48.
*Generalized Telangiectasia and Sinus Infection. S. Ayres, L. A. Burrows and N. P. Anderson, Los Angeles.—p. 56.
Keratosis Follicularis Sine Dyskeratosis. F. A. Diasio, New York.—p. 60.
*Lupus Vulgaris. J. H. Broers, the Hague, Holland.—p. 68.
Erythema Nodosum. V. H. Moon and A. Strauss, Philadelphia.—p. 78.
Treatment of Vascular Nevi by Injection of Sclerosing Solutions. G. C. Andrews and R. J. Kelly, New York.—p. 92.
*Verrucae Vulgares (Palmar and Plantar). Sophie A. Lurie, Los Angeles.—p. 95.
Twisted Hairs (Pili Torti). F. Ronchese, Providence, R. I.—p. 98.
*Cutaneous Melanomas, with Especial Reference to Prognosis. H. J. Farrell, Milwaukee.—p. 110.
Phenolphthalein Eruption. F. G. Novy, Ann Arbor, Mich.—p. 123.
*Granuloma Pyogenicum. D. W. Montgomery and G. D. Culver, San Francisco.—p. 129.
*Normal Pigmentation of Oral Mucosa. S. Monash, New York.—p. 137.

Blood Sugar Metabolism in Certain Dermatoses.—Strickler and Adams report that of 202 blood sugar determinations in 101 cases of acne vulgaris, 10 per cent were above 110 mg. per hundred cubic centimeters. Of 101 patients, 19 per cent at some time during the period of observation showed a blood sugar value above 110 mg. Of the group of single determinations covering forty-eight of the cases of acne vulgaris, 88 per cent fell within from 80 to 110 mg. Assuming 15 per cent to be a true representation of cases exhibiting hyperglycemia, it is concluded that acne vulgaris is not characterized by hyperglycemia, as a fair percentage of normal persons at times may be slightly hyperglycemic. Changes in the blood sugar in individual cases over periods of as long as three months do not coincide with clinical improvement or relapse. No particular type of acne vulgaris is characterized by either hypoglycemia or hyperglycemia, nor are the two factors blood sugar and clinical changes related to sex, age or duration of the disease. Hyperglycemia probably is not associated with seborrhea (11 per cent of eighteen determinations in thirteen cases were above 110 mg.), psoriasis (ten determinations in nine cases were all normal) or vegetable parasitic infections (fifteen determinations in thirteen cases were all normal). Although the number of cases in the latter diseases is small, it indicates that in a larger number of cases hyperglycemia probably would not prove characteristic. In respect to all the diseases reported, the observation may be correct that a diet rich in sugar or other carbohydrates is inimical, particularly for certain patients with acne vulgaris, but this claim is not substantiated by the actual changes in the blood sugar. It is possible that excessive carbohydrates exert an indirect effect on this disease which is not demonstrable by the present type of chemical studies of the blood.

Bacteriology of Intestine and Blood in Psoriasis.—Torrey and Schwartz give a report on intestinal flora in thirty cases of psoriasis and on blood cultures in sixteen cases. The observations indicate that the types of bacteria vegetating in the intestine in such cases, as revealed by examinations of the stools, do not differ essentially either qualitatively or quantitatively from what might be encountered in a similar series of nonpsoriatic persons who are not sufferers from gastrointestinal disabilities. There was no evidence, so far as could be judged from the bacterial types encountered, that any unusual bacterial toxin of a soluble nature or toxic product from bacterial decomposition is formed in the intestinal tracts of sufferers from this skin disease. These examinations did not reveal unusual numbers or types of yeastlike fungi in the stools. Monilias occurred irregularly and always in small numbers. Blood cultures were negative in eleven of sixteen cases. In the five cases giving positive cultures, bacteria apparently of intestinal or buccal origin were isolated; but these were diverse in type and evidently merely casual invaders of the blood stream. Intradermal inoculations were made with autogenous antigens prepared with cultures isolated from the stools or the blood in ten cases. There was no evidence of sensitization of an allergic nature to the test bacteria in these cases of psoriasis.

Treatment for Lichen Planus with Injections of Bismuth Salicylate in Oil.—Grossman reports that in a series of fifteen cases treated by him over a period of three years, fourteen patients took the prescribed course of bismuth salicylate in olive oil and are well; one took only a partial course and was improved when last seen. The full course of treatment consists of 1½ grains (0.1 Gm.) of bismuth salicylate intramuscularly once a week for from ten to twelve treatments. Frequently, fewer injections are needed.

Generalized Telangiectasia and Sinus Infection.—Ayres and his associates give the clinical history of a patient with a typical and extensive case of generalized telangiectasia who had suffered from a chronic sinus infection for at least five years. Seven months after the first dermatologic examination, the patient reported again for observation. The improvement in the eruption was striking. During this time she had had local treatment for the infected sinuses, and a permanent window had been made in the right antrum. At this time cultures of washings from the right antrum yielded Streptococcus viridans and Staphylococcus aureus on Löffler's medium. As an antigen for an intradermal test, 0.05 cc. of heat-killed saline suspension of each of these organisms containing 500 bacteria per cubic centimeter was used, saline washings from sterile culture mediums being used as a control. Within twenty-four hours, a strongly positive reaction was observed at each test site, consisting of a red tender swelling about 38 mm. in diameter. The control was negative. A vaccine was then prepared from the organisms and administered. Two and a half months later the patient reported for observation again, and the eruption had entirely disappeared. The disappearance of the rash coincident with the eradication of the chronic sinus infection does not prove a relationship between the two, but it seems sufficiently convincing to justify a thorough search for foci of infection in future cases of this disorder, and serious consideration should be given to the nasal sinuses as a possible source of trouble.

Lupus Vulgaris.—Broers points out that with the pyrogallol method one reaches the latent lupus spots, which are not yet clinically recognizable. The pyrogallol itself seeks all the diseased tissue, as it were, and destroys that in a far better way than the dermatologist himself could. As exposure of the wound, covered with pyrogallol ointment, to the air, is sometimes very painful, the renewal of the ointment must be done not only quickly but also with the necessary ointment bandages prepared in advance, so that after the cleansing of the serous wound surface they can be applied immediately. Should the healthy area surrounding the sore, which begins to define itself after a few days, unexpectedly show symptoms of dermatitis, a simple layer of resorcinol paste around the wound is sufficient to put a stop to them. A layer of ointment the thickness of a knife must be smeared on the bandages with a spatula of glass or wood, as with a metal spatula chemical compounds arise that diminish the action of the pyrogallol. Occasionally it is necessary to add procaine hydrochloride, from 1 to 2 per cent, to the ointment, as daily contact with the patient and some persuasion are usually sufficient to convince him that the rigorous action of the ointment is necessary to burn out the deeply situated tuberculous process entirely. The application of the 10 per cent pyrogallol for one month is sufficient for the distinct demarcation of the tissue to be eradicated. The original small lupus spot is seen as a black, ugly (and if it is large, as a malodorous) tumor, from two to two and a half times larger, discharging serous and purulent matter. It is practical sometimes to cut off superficially larger necrotic pieces of tissue, which, saturated with pyrogallol, are of a grayish color; the healing of the wound will be somewhat accelerated. This does not hurt nor is there any bleeding, as the tissue is a stiff collagen mass. The 2 per cent pyrogallol ointment is used the second month, and the painfulness becomes much less by the end of this period;

moreover, the patient himself notices that the necrotic tissue, cleanly defined, is rising out of the wound, which again encourages him to continue the treatment. The third month the wound closes under treatment with 0.5 per cent pyrogallol ointment and the painfulness disappears altogether.

Verrucae Vulgares.—Altogether forty-nine patients have been treated by Lurie with intramuscular injections of bismuth salicylate. Five were adults; the others, children. The injections were given, one week apart, intramuscularly into the upper outer gluteal quadrant, the amount injected varying according to the age. Children from 6 to 10 years of age were given 1 grain (0.065 Gm.) of bismuth salicylate intramuscularly; children from 10 to 13 years of age, 1½ grains (1 Gm.), and the older ones, 2 grains (0.13 Gm.). Recently the technic has been changed as follows: One injection is given, and the wart is observed. Regression usually begins immediately, and no further treatment is given until the condition becomes stationary. Subsequent injections are then administered, sometimes with an interval of two or three weeks between treatments. An interesting peculiarity was observed: the plantar warts, so-called papillomas, respond spectacularly to this treatment, in many cases more rapidly than those on the hands. In some cases the warts seem to melt; in other cases the wart comes out like a kernel; but, in general, layer by layer disappears beneath which bloody points (projections of the papillae corii) occur, which gradually dry up and come off, leaving a smooth area without scars. The pains and aches become less intense after the first injection. Sometimes one and sometimes three injections are sufficient treatment for warts that have been annoying for months. The largest number of injections was nine, given in only one case.

Cutaneous Melanomas, with Special Reference to Prognosis.—Farrell analyzes the histories of 265 patients with melanomas who were examined at the Mayo Clinic. Various types of melanomas are described. Clinical and histologic descriptions are presented, and the differential diagnosis of allied lesions is considered. Of these 265 cases, 188 were suitable for analysis from the standpoint of prognosis. The data resulting from this analysis are summarized in a table. The dangerous type of mole is slightly elevated, with a thin, smooth covering of epidermis, steel blue or blue black and situated in an area subjected to trauma. Lesions of this type should be radically excised early. About 4 cm. of normal skin on all sides of the lesion should be included, and the incision should be deep enough to include the subcutaneous tissue. When the regional lymph nodes are extensively involved by metastasis, intensive roentgenologic treatment should be instituted in preference to radical surgical treatment. However, when only a few discrete metastatic nodes are present it is probably better to excise them and follow up with heavy doses of roentgen rays or radium. The author believes that early, radical removal of any type of nevus subjected to trauma is the only means of reducing the high mortality rate of melanomas.

Granuloma Pyogenicum.—Montgomery and Culver believe that although granuloma pyogenicum is a simple tumor, consisting as it does of granulation tissue, it is worthy of separate consideration, both because it gives rise to so much anxiety on the part of the patient and because of its liability to recur, and therefore on account of its simulation of a malignant growth. It is also well to remember that, though no further operation than curettage is necessary, this must be done thoroughly so as to include the blood vessels feeding the tumor as far down as the curet will go, that a caustic should be employed to go down still deeper, and that radium or roentgen treatment is also undoubtedly beneficial. Excision also may be employed, but subsequent treatment with the roentgen rays or radium is a further security against recurrence. The old axiom that the physician must not withhold from a patient any treatment that he considers beneficial should still be remembered.

Normal Pigmentation of Oral Mucosa.—Monash describes physiologic oral pigmentation; it is shown to be common in dark-skinned persons and to differ in no essential respect from that observed in the Negro. The author emphasizes the fact that the likelihood of oral pigmentation being physiologic and not due to Addison's disease must always be kept in mind.

Archives of Internal Medicine, Chicago

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Diffuse Hemorrhage from Stomach. E. L. Bortz, Philadelphia.—p. 1.
*Use of Liver Extract Intravenously: Report of Ten Cases. P. J. Fouts and L. G. Zerfas, Indianapolis.—p. 27.
*Variations in Total Blood Lipid in Alimentary Lipemia. H. F. Wechsler, New York.—p. 37.
Influence of Carbohydrate Metabolism of Experimentally Induced Hepatic Changes: I. Fasting and Administration of Thyroxine. T. L. Althausen, San Francisco, and E. Thoenes, Leipzig, Germany.—p. 46.
Id.: II. Phosphorus Poisoning. T. L. Althausen, San Francisco, and E. Thoenes, Leipzig, Germany.—p. 58.
*Solar Radiation in Relation to Endemic Goiter. J. H. Smith, Richmond, Va.—p. 76.
*Effects of Prolonged Liver Dietary in Pernicious Anemia: Case Reports of Three Patients Receiving Liver Therapy for Nine and a Half, Eight and Seven Years, Respectively. R. B. Gibson and W. M. Fowler, Iowa City.—p. 124.
Myocardial Infarction or Gross Fibrosis: Analysis of One Hundred Necropsies. J. R. Lisa and A. Ring, New York.—p. 131.
Bismuth Diuresis and Blood and Urinary Changes Under Clinical Conditions. A. B. Stockton, San Francisco.—p. 142.
Experimental Low Colonic Obstruction. G. M. Roberts and L. A. Crandall, Chicago.—p. 150.
Toxicity of Mersalyl (Salyrgan): Clinical and Anatomic Study. L. Tarr and S. Jacobson, New York.—p. 158.

Use of Liver Extract Intravenously.—The potency of a small amount of liver extract administered intravenously, as reported by Castle and Taylor, has been fully confirmed by Fouts and Zerfas by their results in the treatment of seven patients with pernicious anemia and three patients with hemolytic jaundice. Five of the cases also illustrate that small amounts of liver extract, given intravenously, have been effective in patients whose red blood cells were not maintained at normal levels, although the amount of potent extract derived from 300 to 600 Gm. of liver had been given daily, by mouth, over a period of time. This suggests, as Castle and Taylor pointed out in their paper, that there is possibly a defective absorption of the active principle from the gastro-intestinal tract in such cases. It would also seem that there is a considerable variation in individual patients and in the same patient in this respect. While it is definitely known that most therapeutic agents are much more effective when given intravenously than when given by mouth, it would appear that, in the case of liver extract, the difference in potency cannot be accounted for entirely by this variation. In the presence of persistent diarrhea, nausea and vomiting and in the treatment of certain fastidious patients, the intravenous method of administration should also be of considerable value. It is generally known that, in the presence of infectious processes, fever and intoxication, liver extract given by mouth has been relatively ineffective. Two of the authors' cases show that liver extract administered intravenously was highly efficacious in the presence of fever. Although the reticulocyte peak is reached sooner when liver extract is given intravenously than when it is given orally, its use alone will not suffice in patients who are desperately ill. It would appear, however, that the intravenous use of liver extract supplementary to blood transfusions is indicated in this type of case. While the authors believe that the intravenous administration of liver extract will not supplant its use by mouth, they are convinced that its supplementary use, intravenously, will be of distinct benefit in the therapy of pernicious anemia and possibly in other macrocytic anemias. Since submitting their paper for publication they have treated twenty-five additional cases of primary pernicious anemia with liver extract administered both intramuscularly and intravenously, making a total of five hundred injections. In every instance the clinical improvement and the hematologic response have been as striking as in the ten cases reported.

Variations in Total Blood Lipid in Alimentary Lipemia.—Wechsler presents the total blood lipid curves after the ingestion of 100 cc. of olive oil in sixty-seven subjects who were apparently free from pancreatic or hepatic disease. The curves could be subdivided into three categories: ascending, 63.2 per cent; flat, 17.5 per cent, and descending, 19.3 per cent. The age of the subject and the presence of arteriosclerosis markedly influenced the total blood lipid. Persons in the second and third decades presented a flat curve, those in the fourth, fifth and sixth decades presented an ascending curve, and those who showed evidence of arteriosclerosis presented a flat or descending curve. Starvation produced a moderate progressive rise

in the total blood lipid. Dextrose eliminated the starvation effect.

Solar Radiation in Relation to Endemic Goiter.—In a statistical study of endemic goiter in the United States, India, New Zealand and South Carolina, Smith found that a deficiency of solar radiation tends to a deficiency of the iodine content of the thyroid, because of a lack of irradiation of the air, soil, food, drinking water or the skin of the animal organism, tending to an increased prevalence of goiter. In addition, the iodine content of potatoes in districts of South Carolina, according to the distance from the sea, appears to vary with solar radiation during the late summer months, suggesting that solar radiation at this period of the year may have some influence on the iodine content of vegetables.

Effects of Prolonged Liver Dietary in Pernicious Anemia.—Gibson and Fowler present the case reports of three patients with pernicious anemia for whom a liver dietary was prescribed from 1921 to 1924 along with other therapeutic measures to enhance and maintain the remissions. These patients are undoubtedly the longest survivors among patients treated with liver for pernicious anemia whose records have been followed. While the liver dietary was neglected at times by two patients with recurrence of the anemia, subsequent adherence to the dietary instructions has resulted in prolonged remissions, recovery of normal body strength and return to their occupations. A third patient followed his dietary prescription consistently until four months previous to the last admission to the hospital (July, 1931) with the resulting attack of the anemia; a previous attack in 1924 followed an acute infection said to be influenza, so his remission had lasted six and one-half years. As has been observed in other cases by later workers with liver and active extracts, the neurologic symptoms, the glossitis and achlorhydria in the three patients with pernicious anemia have remained essentially unimproved. For two of the patients, renal function is satisfactory; renal damage is evident in one case and possible injury attributable to the daily nucleoprotein intake cannot be excluded. But because of the progress all three patients have made and because of dietary factors in liver other than the substance effecting regeneration of the blood, the authors feel that the dietary treatment of pernicious anemia should not be neglected, even though liver extracts are employed to induce and maintain the remissions.

Archives of Pathology, Chicago

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Sacrococcygeal Tumors. E. N. Ballantyne, Hamilton, Canada.—p. 1.
Bands and Ridges in Pulmonary Artery. O. Saphir, Chicago.—p. 10.
*Relation of Fibro-Adenoma and Chronic Mastitis to Sexual Cycle Changes in Breast. Helen Ingleby, Philadelphia.—p. 21.
Experimental Pathology of Liver. G. M. Higgins and R. M. Anderson, Rochester, Minn.—p. 42.
*Meconium Peritonitis. W. S. Boikan, Chicago.—p. 50.
Action of Parathyroid Hormone on Epiphyseal Junction of Young Rat. H. Selye, Baltimore.—p. 60.
*Experimental Production of Gallstones. C. A. Hospers, Chicago.—p. 66.
Pathologic Physiology of Parathyroid Glands. K. Semsroth and H. B. McClugage, Pittsburgh.—p. 79.

Fibro-Adenoma and Sexual Cycle Changes in Breast.—Ingleby reports that, in twenty-one cases of fibro-adenoma of the breast, a comparison of tumor and breast from the same patient showed that in patients with a regular menstrual cycle the same type of cyclic change was found in the tumor as in the adjacent normal breast. It was found possible to diagnose the stage of the cycle from an examination of the tumor alone. One tumor was removed during pregnancy and one after parturition. The former showed hyperplasia resembling that occurring during pregnancy; the latter had characters partly of lactating breast and partly of involution following lactation. In four cases in which the menstrual periods were irregular, it was not possible to assign the tumor to any special phase of the cycle. Hyperplasia with growth of new lobules occurs regularly in fibro-adenomas during the premenstrual phase of the sexual cycle. This is most easily seen at the edge of the tumor. Involution is often incomplete. Hyperplasia of periductal fibrous tissue may be in excess of the normal. It follows that a fibro-adenoma is the result of a local irregularity in growth and regression of the sexual cycle in the breast. What provokes the irregularity is not known. Disturbance of the balance of hormones concerned with the sexual cycle may be considered the most important etiologic factor in mazoplasia. Cases are recorded to show the close association of so-called chronic mastitis, or mazoplasia, with irregularity of the menstrual cycle, which is taken as an index of hormonal disturbance. Inflammation is not an etiologic factor in mazoplasia. Three cases of severe chronic inflammation of the breast showed no irregularity in the sexual cyclic changes. It was found possible to produce a cystic condition and irregular hyperplasia in the breasts of rats by upsetting the estrual cycle.

Meconium Peritonitis.—Boikan presents a case of meconium peritonitis from spontaneous intra-uterine rupture of a Meckel's diverticulum in the first half of intra-uterine life. The cause of the rupture was the excessive development of lymphatic tissue in association with deep submucosal crypts of Lieberkühn in the wall of the diverticulum, with secondary focal disappearance of muscularis. Rupture took place with the development of positive intra-intestinal pressure from the entrance of meconium. The short segment of ileum and the entire colon distal to the perforation were hypoplastic and devoid of contents, the colon retaining its early fetal proportion to the small intestine. This is attributed to the lack of the distending and growth-stimulating action of the meconium, diverted by the perforation into the peritoneal cavity.

Experimental Production of Gallstones.—Hospers states that a combination of hypercholesteremia, induced by intraperitoneal injections of a watery emulsion of cholesterol, and infection of the gallbladder, produced by direct cystic injection of Bacillus typhosus, failed to lead to the formation of cholesterol gallstones in rabbits. Pigment calculi were formed in many of the gallbladders, and in some of the rabbits cholesterol crystals were found in the bile. In no instance, however, had any appreciable quantity of the cholesterol been incorporated in or incrusted on the pigment stones. In a review of the literature, the author gives the numerous methods used in attempts to produce gallstones experimentally. Foreign bodies in the gallbladder have frequently become coated with pigment. Stasis alone has been unsuccessful but, when combined with infection, has on occasion led to the formation of pigment stones often combined with carbonates. Cholesterol stones have been found in hypercholesteremic animals in a few instances, but these results have failed of confirmation. Recently, minute cholesterol stones have been reported in a few vitamin-deficient animals. Various combinations of the methods named have given no better results. No method has been found that will produce gallstones, especially of the cholesterol type, with any degree of certainty.

Canadian Public Health Journal, Toronto

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Epidemic of Milk-Borne Paratyphoid Fever: I. Epidemiologic Features. A. L. McKay, St. Catharines, Ont.—p. 303.
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Id.: III. Bacteriologic Studies. A. L. McNabb, St. Catharines, Ont.—p. 308.
Id.: IV. Milk Pasteurizing Equipment. A. E. Berry, St. Catharines, Ont.—p. 310.
Modern Public Health. J. H. Radford, Galt, Ont.—p. 314.
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Mortality in Ontario of Four Communicable Diseases of Childhood. Mary A. Ross, Toronto.—p. 331.

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Biologic and Chemical Studies of Lactobacillus Genus, with Especial Reference to Xylose Fermentation by L. Pentoaceticus. L. Weinstein and L. F. Rettger.—p. 1.
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Mechanical Spinner for Esmarch Cultures. H. Gee, La Jolla, Calif.—p. 35.
Reduction of Sulphur Containing Compounds in Wood Pulp and Paper Manufacture. T. D. Beckwith and J. R. Moser, Berkeley, Calif.—p. 43.
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Identity of Bacillus Putrificus Bienstock. A. Cunningham, Edinburgh, Scotland.—p. 61.
Studies on Lactobacillus Acidophilus and Lactobacillus Bulgaricus: XI. Electrophoresis Studies. R. H. Weaver, Lexington, Ky.—p. 73.

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Precipitation Test for Sexes of Fowl Blood Serum, with Especial Reference to Egg-Laying. K. Sasaki, Fukuoka, Japan.—p. 1.
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Further Attempts to Transfer Immunologic Response of Tuberculous Animals. L. Dienes, Boston.—p. 29.
Blood Grouping in Poliomyelitis: Its Relation to Susceptibility and Neutralizing Property of Convalescent Serums. C. W. Jungeblut and L. W. Smith, New York.—p. 35.
Serologic Diversity Among Meningococci. Sara E. Branham, Washington, D. C.—p. 49.
Heredity of Agglutinogens M and N of Landsteiner and Levine: III. Medicolegal Application for Determination of Nonpaternity. A. S. Wiener, S. Rothberg and S. A. Fox, Brooklyn.—p. 63.
Experiments in Passive Transference of Urticarial Hypersensitiveness to Fungous Extracts. (A) Immunologic Grouping of Trichophytons and Monilia; (B) Refractoriness of Certain Individuals to Sensitization by Reagins. Marion B. Sulzberger, New York.—p. 73.
Agglutinin Response to Typhoid-Paratyphoid Vaccination. S. Mudd, Philadelphia.—p. 81.
Mouse Protection Test on Antipneumococcic Serum Type I. S. D. Beard and Frances L. Clapp, Pearl River, N. Y.—p. 91.
A Nonspecific Cutaneous Sensitivity Which Is Passively Transferable with Serum to Normal Human Skin: Preliminary Report. M. Walzer, Brooklyn.—p. 99.

Journal of Urology, Baltimore

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Graphic Registration of Function of Human Ureter with Hydrophoragraph: Considerations in Physiology and Pathologic Physiology of Ureter. H. R. Trattner, Cleveland.—p. 1.
*Surgical Accidents to Pelvic Ureter in Female: Report of Four Cases. E. W. Beach, Sacramento, Calif.—p. 35.
Single Ectopic Ureter: Report of Case. G. A. Winfield and C. C. Higgins, Cleveland.—p. 53.
Massive Hemorrhagic Cyst in Wilms Tumor of the Kidney in Adult. J. H. Neff.—p. 65.
*Giant Renal Calculus: Carcinoma of Kidney Pelvis: Report of Case. S. J. Waterworth, Clearfield, Pa.—p. 77.
(A) Simultaneous Intraperitoneal and Extraperitoneal Nephro-Ureterectomy; (B) Ureterovaginostomy for Pyo-Ureter. E. L. Keyes. —p. 85.
Lymphosarcoma of Prostate. R. S. Ferguson and F. W. Stewart, New York.—p. 93.
*Deep Roentgen-Ray Therapy in Treatment of "Painful Heel": Report of Thirty-One Cases. F. Liberson, New York.—p. 105.
*Spontaneously Expanding Bougie for Ureteral Dilation. B. E. Fillis, Hubbard Woods, Ill.—p. 117.
New Instrument for Magnification, Anesthesia, and Electric Destruction of Small Genito-Urinary or Other Sinuses. J. L. Wollheim, New York.—p. 121.
Simple Method for Making a Self-Retaining Catheter. H. F. Ullrich, New York.—p. 123.

Surgical Accidents to Pelvic Ureter in Female.—According to Beach, most ureteral accidents can be forestalled. Precise anatomic knowledge inclusive of morbid deviations, and preliminary ureteral catheterization for complicated cases, are guards against disaster. Certain morbid conditions involving the uterus, its adnexa or the ureter itself invite injury to the latter. Connascent possibilities must be remembered. The ureter is most often injured in hysterectomy especially for cancer. The usual sequela is a ureterovaginal fistula. Complete ureteral section disrupts the neuromuscle mechanism and usually dooms the kidney. The pace of kidney dissolution is determined somewhat by the remedial measure adopted. The best reparative measure is undoubtedly cysto-ureterotresis, when possible. Even ideal ureteral anastomosis often culminates in segmental atony or stricture with superimposed infection. Nephrectomy should be done last, since the other procedures transfer the load gradually to the opposite side. Nephrectomy is interdicted at the time of accident.

Giant Renal Calculus.—Waterworth reports one of the largest stones (1,100 Gm., or 2 pounds 6 ounces) successfully removed at operation. The case is interesting in that such a large stone should produce little or no disability in spite of a probable duration of twenty-eight years. The irritation caused by the presence of the stone over such a long time had resulted in the development of an epithelioma of the pelvis of the kidney, which recurred following operation and ultimately resulted in the death of the patient.

High Voltage Roentgen Therapy in Treatment of "Painful Heel."—Liberson reports that among 924 cases of gonorrheal infection admitted to the United States Marine Hospital from December, 1925, to Jan. 31, 1930, over 3 per cent of the complicated cases presented gonorrheal periostitis, with or without active infection in the genital tract. Operative treatment for gonorrheal exostosis is not entirely satisfactory on account of prolonged preoperative and convalescent periods and frequency of recurrence. Local high voltage roentgen therapy, simultaneous with general measures to eradicate the source of gonorrheal infection when present, yield a shorter average stay in the hospital and a more permanent result in a greater number of cases.

Expanding Bougie for Ureteral Dilation.—Fillis presents a new dilating ureteral bougie made of sea tangle. The principle of sea tangle tents has long been known to gynecologists. Its application to the ureter has been successfully demonstrated in selected cases of ureteral calculi. The ureteral bougies are made of sea tangle, a form of sea weed, and vary in length up to 45 cm., with a diameter of 1 mm. and greater. After contact with aqueous solution for several minutes the bougie becomes flexible, and if contact continues flaccidity occurs. The surface is smooth and mucilaginous after short contact with aqueous solutions. The average bougie doubles its diameter after contact with the water, urine or mucus for thirty or forty minutes. The expansion continues for twenty-four hours. The consistency is firm and elastic and the sea tangle does not disintegrate. The ureteral bougie may be used for the purpose of gradual dilation of a ureter. The whole or part of a ureter may be dilated to any practical degree, depending on the size of the bougie and the length of time it is allowed to remain in situ. This ureteral bougie is of especial value in dilating a ureter. In this case it is advisable to use a bougie that readily passes into the ureter but not alongside or beyond the calculus. If two small tents are used, urinary efflux is not so quickly impaired, and the dilation is more rapid. If a small catheter can be passed alongside the calculus, preceding the passage of the bougie, the calculus may be dislodged by the catheter when it is withdrawn following the removal of the bougie. The catheter serves also to drain the renal pelvis during ureteral dilation. In cases in which it is desired to dilate the entire ureter, the control should be checked and the bougie withdrawn a short distance at intervals.

Pennsylvania Medical Journal, Harrisburg

35: 685-750 (July) 1932

Symposium on Gonorrhea. D. H. Ruben, Washington.—p. 685.
Gonorrhea in Its Relation to Public Health. W. H. Mackinney, Philadelphia.—p. 688.
When Is Gonorrhea Cured? C. J. Bucher, Philadelphia.—p. 690.
Renal Glycosuria. W. S. Magee, Philadelphia.—p. 692.
Ear Injuries in Fractures of Base of Skull. W. T. Hunt, Jr., Huntington.—p. 694.
Cutaneous Pigmentations and Their Significance. F. M. Jacob, Pittsburgh.—p. 697.
Ocular Infections of Focal Origin. M. M. Williams, Scranton.—p. 701.

Philippine Islands M. Assn. Journal, Manila

12: 97-146 (March) 1932

Greater Significance of Soy Bean in Filipino Dietary. I. Concepcion, Manila.—p. 97.
Ignaz Semmelweis, the Precursor of Listerism in Obstetrics. H. Acosta-Sison, Manila.—p. 107.
Extra-Uterine Pregnancy: Lithopedion of Fifteen Years' Duration Successfully Removed by Surgical Operation. S. A. Francisco, Los Banos; A. V. Ascalon and R. A. Raymundo, San Pablo.—p. 113.
The Medical Practitioner and the Antituberculosis Campaign. M. V. Arguelles, Manila.—p. 122.

Philippine Journal of Science, Manila

48: 129-289 (June) 1932. Partial Index

Avian Malaria Studies: IV. Hemoproteus and Plasmodium in Birds of Luzon, Philippine Islands. P. F. Russell, Manila.—p. 263.
Id.: V. Plasmodium Capistrani Sp. Nov., an Avian Malaria Parasite in the Philippines. P. F. Russell, Manila.—p. 269.

48: 291-483 (July) 1932. Partial Index

Charcoal as a Diluent for Paris Green in Destruction of Anopheles Larvae: Larvicide Studies. P. F. Russell and A. P. West, Manila. —p. 291.

Tennessee State Medical Assn. Journal, Nashville

25: 251-292 (July) 1932

Management of Posterior Positions of Occiput. C. C. Vinsant, Maryville.—p. 251.
Mesenteric Abscess Complicating Typhoid Fever. A. G. Kern, Knoxville.—p. 260.
My Experience with Prostatic Resection. G. R. Livermore, Memphis. —p. 263.
Modern Treatment of Burns. R. F. Mason, Memphis.—p. 267.
"Glaucoma." J. R. Hamilton, Knoxville.—p. 272.
Nervous Indigestion. J. L. Bibb, Chattanooga.—p. 276.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Radiology, London

5: 481-544 (June) 1932

*Sialography. R. T. Payne.—p. 492.
Shadows Distal to Internal Epicondyle. H. Davies.—p. 497.
Production of High Frequency Currents by Mercury Arc. B. D. H. Watters.—p. 498.
General Technic for Radiography of Joints. R. M. Leman.—p. 501.

Sialography.—Payne's conclusions are based on a consideration of twenty-one cases in which sialography of one or more of the salivary glands was carried out. He states that sialography with iodized poppy-seed oil is a simple and a safe procedure. By its means the normality or abnormality of the salivary ducts and their branches can be demonstrated, and in pathologic conditions affecting the glands, the ducts or the vicinity, the information so gained may render diagnosis more exact and consequent treatment more rational. In cases of parotid fistula the method provides accurate information which has an important bearing on surgical treatment. In cases of doubtful parotid calculi, the evidence of sialography may at times establish the diagnosis. In conditions of recurrent parotitis a variety of lesions may be demonstrated by the method, which thus gives invaluable information of the extent of the disease and provides a basis for rational treatment. Disorganization and destruction of glandular tissue may be demonstrated after acute infections of the salivary glands and operations. When doubtful shadows appear in the vicinity of the salivary glands, sialography may be used to show that they are not in connection with the ducts. In a variety of pathologic conditions affecting both the salivary glands themselves and the adjacent tissues, the method may be of value in excluding lesions of the ducts.

British Medical Journal, London

2: 1-42 (July 2) 1932

Address on Koch's Discovery of the Tubercle Bacillus. R. Philip.—p. 1.
*Nasal Sinus Infection. W. Howarth.—p. 5.
Atebrin in Treatment of Severe Malaria. A. J. Orenstein.—p. 8.
Injection Treatment of Inguinal Hernia. G. B. D. Gray.—p. 12.

Nasal Sinus Infection.—Howarth points out that the nasal sinuses when affected acutely show a marked tendency to resolution, but in some cases the disease becomes chronic. Among the causes that may give rise to this are conditions which interfere with normal drainage, excessive virulence of the infecting organisms, repeated attacks of inflammation, the presence of inflammatory changes in the mucous membrane, secretion flowing in from another sinus, and the susceptibility of the individual. Patients suffering from a chronic nasal sinus infection usually come under observation on account of headache, nasal obstruction, discharge, or the complaint of a chronic cold in the head. On the other hand, many cases may be discovered in the search for a septic focus, which is now conducted with such vigor in an attempt to explain digestive, respiratory, ocular or other phenomena. It is therefore of the utmost importance that one should be able to deal adequately with these chronic conditions. In some ways, recognition of chronic sinus infection is easier than when it is acute, in that the nasal passages are less severely congested and examination is therefore less difficult. The detection of pus under or above the middle turbinate or in the postnasal space, the presence of polypi in the nostril or in the choana, crusting in the nose or nasopharynx, or secondary changes in the larynx will help to guide one toward the group of sinuses that is affected, and it should not be very difficult, with careful examination, roentgenography, proof puncture, and suction to get a reasonable idea of the extent of the infection and its exact situation. When suppuration is well established in any sinus, it is rather a waste of time to devote much attention to attempted relief by puncture and lavage, and treatment should be mainly surgical. The author is not in favor of drastic surgical measures for the cure of suppuration in any sinus and thinks that if steps are taken to provide adequate drainage the vast majority of cases will settle down satisfactorily; but the drainage provided by the operation must be sufficient to drain the cavity completely.

Edinburgh Medical Journal

39: 409-460 (July) 1932

*Sweat Gland Carcinoma of Breast: Morphohistologic Study. E. K. Dawson.—p. 409.
Studies on Blood and Tissue Reactions: IV. Peripheral Blood Picture Is Image of Focal Lesion. W. F. Harvey and T. D. Hamilton.—p. 439.

Sweat Gland Carcinoma of Breast.—Dawson states that pale epithelium in the breast, which some observers call "sweat gland tissue," is derived, apparently in all cases, from normal mammary glandular tissue and has no demonstrable connection with actual sweat gland structures. Structures lined by pale epithelium are not found in normal, noncystic breast tissue; where they do occur they are cystic formations, to be attributed to some excessive antecedent epithelial proliferation, followed by degenerative changes. This epithelial proliferation with subsequent degeneration may be found in various conditions of mammary activity and at different ages but is predominantly associated with gandular involution of the menopausal period, when cystic conditions of the breast are most in evidence. The pale change is regarded as postproliferative; i. e., it indicates a degeneration which supervenes on the earlier epithelial activity of normal cells and checks it. The question, therefore, of the malignant possibilities of the pale cell does not need consideration, if this view can be accepted. This view of the essentially degenerative character of pale epithelium finds much clinical support in the long-maintained benign course of those cystic breast conditions which histologically show widespread pale changes. The material examined by the author (700 large breast sections and numerous small ones) showed the presence of pale epithelium in practically every state of breast tissue associated with cyst formation; e. g., cystic mastitis, cystic benign tumors and malignant growths associated with cysts. Pale cysts may also occur in breasts otherwise apparently normal, where they indicate an earlier excessive epithelial cell activity which has passed into quiescence. Of 120 cases of malignant tumor examined in detail in whole breast sections, 116 showed the presence of pale epithelium in addition to the malignant tissue, but in no single case was the origin of the carcinoma to be attributed to the progressive proliferation of the pale cell. No pale cells were found in the remaining four cases. Even when the malignant tissue, because of its large eosinophil cells, suggested a similarity to the pale cells, in every instance the transition to the malignant cell type could be traced from the normal mammary epithelium lining a large or small duct, the nonmalignant proliferative stage of which showed no indication of the pale change. No case of "acinar carcinoma" was observed in this series of malignant growths. The view that pale epithelium in the breast has no connection with actual sweat glands and has no malignant tendency but is essentially a type of epithelial degeneration associated with cyst formation is strengthened by the fact that it has been observed in other organs of the body, such as the ovary, uterus, prostate and kidney, in which glandular activity, followed by epithelial degeneration and cyst formation, is of frequent occurrence.

Glasgow Medical Journal

37: 1-71 (July) 1932

Our Provision for Treating the Sick. A. K. Chalmers.—p. 1.
End-Results of Tonsils and Postnasal Adenoid Operations. J. K. Love, G. A. Brown and J. Adam.—p. 16.
Primary Intrathoracic Growths: Clinical and Pathologic Study of Cases Occurring in Victoria Infirmary. Marjorie Gillespie.—p. 26.

Heart, London

16: 69-153 (July 1) 1932

Auricular Flutter Presenting a Curious Change in Auricular Electrocardiogram. H. Cookson and A. E. Clark-Kennedy.—p. 103.
Note on Auricular Sounds in Case of Auricular Flutter. D. W. Bennett and W. J. Kerr.—p. 109.
*Vasomotor Regulation of Heat Loss from Human Skin in Relation to External Temperature. G. W. Pickering.—p. 115.
Complete Heart Block Due to Arterial Angioma: Case. R. T. Grant and P. D. Camp.—p. 137.
Complete Heart Block with Varying Ventricular Complexes: Case. C. S. D. Don, R. T. Grant and P. D. Camp.—p. 145.

Vasomotor Regulation of Heat Loss from Human Skin in Relation to External Temperature.—Pickering describes experiments in which he noted that the application of cold to the skin produces reflexly a vasoconstriction which is transient and quickly abolished by again warming the skin.

Application of heat to the skin does not produce vasodilatation reflexly but may give vasoconstriction if the stimulus is excessive. Vasoconstriction arising from the prolonged application of cold to the skin is due in part to the action of a central mechanism excited by cool blood returning from the skin. The vasodilatation that occurs on warming skin that has not been recently cooled is due solely to the action of the central mechanism excited by rise of blood temperature. When the temperature of the tissues is changed by an amount varying from 0.01 to 0.04 C. in from two to four minutes the central mechanism responds. The resultant alteration in cutaneous vasomotor tone antagonizes the tendency of the body temperature to change.

Journal of Physiology, London

75: 273-379 (July 12) 1932

Analysis of Delayed Heat Production of Muscle. W. Hartree.—p. 273.
Pulmonary Edema in Cat Heart-Lung Preparation. W. H. Newton. —p. 288.
Inhibition of Anaphylactic Reaction by Congo Red. J. Gordon and J. M. Robson.—p. 305.
Carbohydrate Metabolism of Isolated Heart of Frog. A. J. Clark, R. Gaddie and C. P. Stewart.—p. 311.
Anaerobic Activity of Isolated Frog's Heart. A. J. Clark, R. Gaddie and C. P. Stewart.—p. 321.
Phosphagen in Perfused Heart of Frog. A. J. Clark, M. G. Eggleton and P. Eggleton.—p. 332.
Interdependence of Gastric Secretion and CO_2 Content of Blood. J. S. L. Browne and A. M. Vineberg.—p. 345.
Influence of Parathyroid on Metabolism of Creatine and Phosphoric Acid: Part I. Phosphate Excretion After Injections of Creatine and Parathormone. Marion Brown and C. G. Imrie.—p. 366.
Id.: Part II. Regulation of Creatine Phosphate After Thyroparathyroidectomy, and So Forth. C. G. Imrie and Constance N. Jenkinson. —p. 373.

Lancet, London

2: 57-110 (July 9) 1932

*Nonspecific Therapy in Mental Disorder. T. C. Graves.—p. 57.
*Prognosis in Acute Nephritis in Childhood. K. H. Tallerman.—p. 60.
New Peptone Treatment in Asthma and Other Allergies. A. G. Auld. —p. 67.
*Lateral Thoracic Jerk: Sign of Aneurysm of Descending Thoracic Aorta. G. Bourne.—p. 68.
High Spinal Anesthesia. E. F. Hill.—p. 71.
Nasal Sinusitis and Eye. E. Watson-Williams.—p. 73.
Micro-Organisms in Catarrhal Jaundice. A. C. Coles.—p. 74.

Nonspecific Therapy in Mental Disorder.—In 1922 Graves suggested that in mental disorders injections of colloidal calcium oleate caused or increased a reaction in or around septic foci with a resulting reduction of general toxemia and improvement of nutrition, circulation, and mental state. Other agents which have been widely used here are colloidal sulphur in oily or watery suspension and TAB vaccine. The focal effects of an injection consist of an active stage, appearing within twenty-four hours as an area of increased vascularity, pain, swelling, exudation, and disturbance of function in or around any localized lesion; and a stage of resolution during which there is a progressive decrease in the inflammatory reaction until the status quo ante is reached or passed. If the sepsis is "open," the focal reaction may be enough to cause a discharge or a reduction of the persistent infection with consequent cessation or mitigation of the toxemia and mental recovery. When, however, the sepsis is "closed," nonspecific therapy is not likely to bring about recovery, especially if the focus contains necrotic material. The result is more likely to be increased toxic absorption, greater toxemia, and exacerbation of symptoms. Colloidal calcium oleate will produce purulent reaction in dental roots and carious teeth in which no such reaction was previously present. Injections of TAB may stop a discharge from the cervix uteri or bring about renewal of discharge from nasal sinuses which had "dried up" although toxemia persisted. Sometimes the reactivation is so acute that the discharges are hemorrhagic. Pyrexia is usually such a striking result of nonspecific agents that the benefit following their use is usually ascribed to the heat produced in the tissues rather than to the agent and the associated focal reaction. In the author's series there were patients who seemed to improve in direct relation to the pyrexia they experienced, but there were others who did not improve, although they had similar rises of temperature; some of them were actually worse. Yet these patients recovered later when their foci were treated surgically, with or without nonpyrogenic nonspecific therapy. The pyrexia induced is not high enough to destroy the organisms in septic foci, and consideration of these cases has led the author to take the view that the pyrexia itself is not the cause of recovery. It is merely the response of the heat-regulating mechanism to the real therapeutic factor, the nonspecific agent. It is an indicator of the activity of the agent and a measure of the efficiency of the heat mechanism. This efficiency can be reduced in toxemic conditions, so that the grade of pyrexial response indicates the severity of the general toxemia. The resolution of septic foci may be followed by improved efficiency in the heat mechanism, and this improvement is often associated with the general metabolic improvement, and so with improved mental capacity.

Prognosis in Acute Nephritis in Childhood.—Tallerman followed up and analyzed twenty-seven consecutive cases of acute nephritis in children whose fate is known. At the time of reexamination the patients had been discharged from the hospital for periods varying from eighteen months to three and a half years. Of these, two died (7.4 per cent.), while eighteen (66⅔ per cent) are regarded as having recovered. Of the remaining seven, only four showed any evidence of persisting renal damage. The importance of examining early morning specimens of urine in all follow-up work of this nature is emphasized. Albuminuria, in the absence of red blood corpuscles, casts or many leukocytes in the urinary deposit, and in the absence of symptoms of renal disease, is regarded as of no serious significance. From his observations the author concludes that the prognosis of acute nephritis in childhood is good and does not appear to be necessarily related to the severity of the original attack.

Lateral Thoracic Jerk.—Bourne describes a systolic movement of the thorax as a whole to the left and shows that graphically this thoracic jerk is a valuable sign of aneurysm of the lower descending thoracic aorta. The mechanism by which the sign is produced is simple, and the lateral movement is readily recognized by the eye. The reason it has apparently escaped description heretofore must be that aneurysms are not frequently localized to the necessary area in the mediastinum. All that is required is that the tumor should be placed low in the posterior mediastinum at the level of the left ventricle; secondly, that it should be wedged between this chamber in front and the spinal protuberance behind. Should these organs lie in such relationship one with another, a lateral systolic movement of the thorax to the left will inevitably result. The contraction of the ventricle presses this chamber's apex against the chest wall on the one hand and against the aneurysm on the other. The aneurysm is almost simultaneously rendered turgid and hard and presses against the spine. The latter structure, especially if the patient is recumbent, is a fixed point from which an oblique line of force is reflected back through the hard aneurysm and contracting left ventricle to the precordium, which is pushed to the left, pulling the rest of the anterior part of the thorax with it. The sign will not be seen if the aneurysm is at a higher level than the ventricles, and if it is pointing laterally on one side or another of the heart. Should some other solid tumor be present in this specific position, the sign would no doubt be equally well produced; but such tumors occur here even less frequently than aneurysms.

Medical Journal of Australia, Sydney

1: 847-876 (June 18) 1932

Peptic Ulcer: Its Causation and Treatment. H. H. Bullmore.—p. 847.
Surgical Treatment of Gastric Ulcer. J. L. McKelvey.—p. 851.
Problems in Jaw Surgery. V. J. Kinsella.—p. 854.
Rontgenographic Investigation of Development of Skeleton. H. Flecker. —p. 859.
*Some Anomalous Forms of Appendicitis. C. H. Hembrow.—p. 862.

Anomalous Forms of Appendicitis.—Hembrow reviews typical cases of appendicitis in which the signs and symptoms may be on the side opposite to that occupied by the cecum. These occur predominantly when the appendix lies to the left of the median line of the abdomen. In a vague abdominal crisis, when the symptoms and signs are referred to the left iliac fossa, appendicitis should be suspected. Transposition should be looked for and excluded. The McBurney incision should not be used in these cases to open the abdomen.

Tubercle, London

13: 433-480 (July) 1932

Spontaneous Pneumothorax. L. S. T. Burrell.—p. 433.
Simple Way of Making Stereoscopic Chest Films. E. Zimmerli and M. D. Basle.—p. 440.
Presence of Tubercle Bacillus in Milk. S. R. Gloyne.—p. 443.

Journal de Chirurgie, Paris

40: 161-320 (Aug.) 1932

Mixed Tumors of Submaxillary Gland. A. Gosset, I. Bertrand and P. Funck-Brentano.—p. 161.
Traumatic Stenosis of Small Intestine. Patel and Desjacques.—p. 182.
*Treatment of Posttraumatic Cerebral Edema. J. Megnin.—p. 193.

Treatment of Posttraumatic Cerebral Edema.—Megnin believes that edema is the most important and the most frequently encountered condition in the course of craniocerebral trauma. For the treatment of edema and its principal manifestation, hypertension, he recommends a hypotensive medication by injection and ingestion of hypertonic solutions. This treatment is a certain and powerful means of lowering the tension of the cerebrospinal fluid and its use whether associated with a series of lumbar punctures or not is highly recommended. A 15 per cent solution of magnesium sulphate given intravenously in an average dose of 60 cc. is preferred to all other solutions. In describing the technic of injection the author gives the following precautions: slow injection and careful watching of reaction, especially the pulse and respiration. If the prescribed precautions are observed, the treatment may be employed without fear in all traumas of the skull with exception of the following contraindications: compression, hypotension, shock, hemorrhage and severe cerebral contusion. The rarity of accidents is stressed. Dowmann (1923) had only good results. Temple Fay gives the magnesium sulphate solution as a routine in all cases except in the presence of the contraindications mentioned.

Revue Française d'Endocrinologie, Paris

10: 189-270 (June) 1932

*Hyperthyroidism and Tuberculosis. G. Maranon.—p. 189.
Treatment of Exophthalmic Goiter by Iodine. J. Vratislav.—p. 208.
Possible Internal Secretion of Lacrimal Glands. Schachter.—p. 234.

Hyperthyroidism and Tuberculosis.—Maranon states that while the thyroid is rarely the seat of infection with tubercle bacilli it is highly sensitive to the action of tuberculosis toxin. In a large number of cases early tuberculosis of various organs, especially the lung, provokes a hyperthyroid reaction. This hyperthyroid reaction almost always occurs in young, asthenic individuals. In these cases it is hard to decide whether the hyperthyroid syndrome is due to an actual hypersecretion of the thyroid or to a neurosympathetic hypertonia. Pathologically it is not possible to separate the neurosympathetic and the thyroid element. Clinically the two symptomatologies mingle and succeed each other. The symptoms of tuberculous hyperthyroidism correspond to those of light forms of thyroid intoxication. The resistance to treatment and the tendency to recurrences are the principal traits. In almost all cases the condition is accompanied by slight fever, especially in female subjects. Hyperthyroidism alone may provoke a condition of fever. Frequently this thermic instability is the early and sensitive manifestation of latent foci of infection (tuberculosis). Tuberculous hyperthyroidism is the most frequent form of infectious hyperthyroidism. Its frequency is explained by the frequency of tuberculosis and the sensitivity of the neuroendocrine system to tuberculosis toxin. It is probably a defensive reaction. Youth and an asthenic constitution constitute the necessary predisposition for the occurrence of tuberculous hyperthyroidism. In a young hyperthyroid individual one should search carefully for the existence of a tuberculous focus. Although it may be impossible to find the focus, the resistance of the hyperthyroidism to treatment suffices to make one suspect a latent, beginning tuberculosis. In these cases, general hygienic treatment is indicated. Insulin is usually of value. It is particularly indicated in early cases of tuberculosis with hyperthyroid reaction.

Schweizerische medizinische Wochenschrift, Basel

62: 681-700 (July 23) 1932

Functions of Bone Marrow Under Normal and Pathologic Conditions. M. Askanazy.—p. 681.
*Increase in Tubal Pregnancy. A. Labhardt.—p. 689.
Contraception, Induced Abortion and Extra-Uterine Pregnancy. H. Guggisberg.—p. 691.

Increase in Tubal Pregnancy.—Labhardt states that the incidence of tubal pregnancy has increased considerably in recent years, and he corroborates his statement by statistics covering the years from 1896 to 1930. He then enumerates and discusses the factors that lead to tubal pregnancy. In the two clinical histories related by him, it appears probable that corrosive fluids which were introduced into the uterus to prevent pregnancy had also entered the tubes and here, on the delicate mucous membrane, had caused changes which subsequently led to tubal pregnancy. The author thinks that the greater frequency of tubal pregnancy is largely due to the increase in contraceptive and abortive measures.

Policlinico, Rome

39: 1157-1196 (July 25) 1932. Practical Section

Necrosis Caused by Epinephrine. F. Corona.—p. 1157.
*Diabetes Insipidus and Its Treatment. C. Faelli.—p. 1161.

Diabetes Insipidus and Its Treatment.—Faelli reviews the literature on diabetes insipidus and states that treatment with posthypophyseal preparations is the most important form of therapy. Its effect, unfortunately, is only temporary. The daily subcutaneous injection of posterior hypophyseal extract (usually 1 cc. and from one to three injections) can be continued indefinitely. Another method of administration is by way of the nose, either through the application of tampons saturated with solution of pituitary or by having the patient sniff dry hypophysis powder. The absorption of hormones introduced through the nasal passage bears satisfactory results and offers no sign of local irritation. Roentgen therapy is seldom applied in diabetes insipidus but is sometimes used in cases in which the condition is due to hypophyseal and juxtahypophyseal tumors. Some authors apply it in cases associated with destructive alterations of the bones. The author experimented with a combination of roentgen therapy of the neurohypophyseal region and application of dry powder of hypophysis to the nose in several patients. The rays were applied in weak doses in order to obtain an inhibitory action on the secretory plexuses so as to get only a decompression of the nervous centers. The results of this combination were more effective than exclusive treatment with solution of pituitary. Taking into account the eubiotic action of roentgen rays on the endocrine glands, the author attributes to his treatment a double advantage; namely, (1) the slow absorption of the solution of pituitary through the nasal mucosa, which permits of a more prolonged action, and (2) the sensitizing of the infundibular centers regulating the metabolism of water with the solution of pituitary which in physiologic conditions must act as a tonic of the infundibular centers.

Beiträge zur Klinik der Tuberkulose, Berlin

80: 139-276 (June 24) 1932

Surgical Collapse Therapy in Pulmonary Tuberculosis. P. Huber and C. Waitz.—p. 139.
Unilateral Spontaneous Valvular Pneumothorax as Complication of Bilateral Artificial Pneumothorax Combined with Unilateral Phrenic Exeresis. K. Nüssel.—p. 158.
Persistent Spontaneous Pneumothorax Cured by Obliteration of Pleural Cavity. A. Kenner.—p. 169.
Cavernous Pulmonary Tuberculosis Without Involvement of Apexes. Berta Elias.—p. 175.
*Blood Picture in Pulmonary Tuberculosis. C. Oestreich.—p. 187.
Influence of Sodium Chloride on Water Economy in Pulmonary Tuberculosis. A. H. Müller.—p. 221.
Influence of Radium Rays on Cultures of Tubercle Bacilli. A. Dimtza and O. Schürch.—p. 225.
Significance of Lattice Fibers in Pulmonary Tuberculosis. S. Puder.—p. 229.
*Pathogenesis of Bronchiectasis: Bronchiectasis and Tuberculosis. G. Simon and W. Blumenberg.—p. 234.
Solution of Formaldehyde for Disinfection of Wool Blankets. M. Hüttig.—p. 271.
Iodine Reaction of Urine in Tuberculosis of Bones and Joints. W. Ehrhardt.—p. 275.

Blood Picture in Pulmonary Tuberculosis.—Oestreich found that in tuberculosis an abundance of complicated details can be observed in the blood picture and that its evaluation is possible only if all these details are taken into consideration. It is almost impossible to designate changes that are characteristic of the hemogram of tuberculosis, or to detect regular changes during the course of the disease as are noted in many other disorders, particularly in acute infections. But still there are certain characteristics. In active tuberculosis there is usually an increase in the leukocytes and in the blood platelets; a decrease in clinically manifest disorders is usually an unfavor-

able sign. Similarly to be estimated are normal numbers in patients who are severely ill, for in these the absence of hyperleukocytosis and of hyperthrombocytosis indicates insufficient mobilization of the defense apparatus of the organism. In the majority of these severe cases, anemia is likewise present as a sign of toxic inhibition of the function of the bone marrow. Especially unfavorable is the condition when the qualitative blood picture presents a lymphopenia and when the neutrophilic leukocytes show nuclear displacement or toxic impairment. A favorable sign is usually an increase in the lymphocytes, for it develops during the healing process of tuberculosis and, as a rule, persists for long periods. Rare and prognostically unfavorable hyperlymphocytosis is to be differentiated from the first form by the frequent pathologic forms (plasma cells) that are detectable in the qualitative hemogram. This unfavorable hyperlymphocytosis is probably the hematologic sign for the involvement of the lymph nodes. Toxic changes in the leukocytes, if present only in some cells, seem to indicate (with reservation) a cavernous disintegration, but when present in the great mass they indicate injury of the bone marrow. A considerable increase in the eosinophil cells is always a favorable sign. The author further discusses the significance of the hemogram for the diagnosis of tuberculosis but stresses that it has value only if all other clinical signs are also considered. Of great importance is the hemogram frequently in deciding whether a tuberculosis is cured; for instance, whether pneumothorax therapy can be discontinued. When the numbers of leukocytes and of blood platelets are normal, when the neutrophilic leukocytes show neither toxic impairment nor pathologic nuclear displacement, and when the numerically somewhat increased lymphocytes do not show pathologic forms and hardly any young forms, cure can be assumed, in the absence of clinical signs.

Bronchiectasis and Tuberculosis.—Simon and Blumenberg show that during childhood bronchiectasis may develop following tuberculous disorders of the lung. Persistent primary tuberculosis is most frequently the cause; it leads not only to the circumscribed forms located in the region of the primary focus or in the hilus but also occasionally to the extensive unilateral bronchiectasis with contraction of the lung. As a secondary disturbance after tuberculosis, bronchiectasis may develop as the result of cicatricial contraction of pleural adhesions and of bronchopulmonary lymph nodes. During childhood, bronchiectasis frequently concurs with minor tuberculous changes in the lungs. The authors found that examination by the culture method and in animal experiments of sputums from children with bronchiectasis gave positive results in 7.45 per cent of the cases. Positive results are usually obtained in cases in which bronchiectatic and tuberculous processes concur, but in exceptional cases also when only bronchiectasis exists. The number of positive observations thus obtained represents a minimum that can be increased by repeated tests and by simultaneous examination of the gastric contents. An exclusion diagnosis based only on the stained specimen is not justified.

Dermatologische Wochenschrift, Leipzig

95: 1009-1052 (July 9) 1932

*Allergic Nature of Bakers' Eczema. Erna Zitzke.—p. 1009.
Mass Arsenic Poisoning Caused by Wine. C. Tropp and G. Rauch. —p. 1023.

Allergic Nature of Bakers' Eczema.—Zitzke reports on cutaneous tests that were made to determine the cause of bakers' eczema. On the basis of these studies she concludes that, in the majority of cases, bakers' eczema is an allergic dermatosis that develops either in persons with an hereditary hypersensitivity or in any baker working under unfavorable conditions. The causative factor of the eczema seems to be certain chemicals that are added to the flour to make it more suitable for baking. Some of these substances that are added to improve the flour contain ammonium persulphate. This substance has a sensitizing effect either as such or by its influence on the flour proteins. To pure flours, to substances that are added to improve the flour but which do not contain ammonium persulphate, also to yeast and to baking powder the hypersensitivity generally develops secondarily; at least this was the case in the persons studied by the author. The monovalent hypersensitive person develops a polyvalent hypersensitivity. However, sensitization by pure flours cannot be denied, for it was observed in two millers. There are also cases of bakers' eczema that by tests are proved to be of a nonallergic character; namely, the dermatomycoses. For the sake of a correct diagnosis, the author considers tests for the detection of allergy advisable in all cases of bakers' eczema. In discussing the treatment of bakers' eczema she states that, in addition to the local application of ointment, nonspecific or specific desensitization may be attempted, but so far this has brought little success. Most important in the combat of bakers' eczema is prophylaxis, that is, exclusion of the causal substance, and for persons who are predisposed to this form of eczema, it is advisable to choose a different occupation.

Deutsche medizinische Wochenschrift, Leipzig

58: 1195-1234 (July 29) 1932

Rheumatic Symptom and Specific Infectious Rheumatism as Disease Entity. S. Gräff.—p. 1195.
*Treatment of Red Birth Marks by Irradiation: Experiences in 200 Cases. Kromayer.—p. 1199.
Pathogenesis of Compact Apoplectic Cerebral Hemorrhage. C. Böhne. —p. 1201.
Pathogenesis of Apoplexy. K. Westphal.—p. 1203.
Relations Between Tonsils and Thyroid. Halle.—p. 1204.
Anatomic and Physiologic Investigations on Goiter in Württemberg. M. Schmidtmann.—p. 1207.
Polycythemia Rubra as Result of Accident. H. Ullmann.—p. 1208.
Pathogenesis of Acute Necrosis of Pancreas. K. Löwenthal.—p. 1209.

Treatment of Red Birth Marks by Irradiation.—For a number of years Kromayer has treated birth marks by irradiation; he sums up his observations in 200 cases as follows: 1. Arterial nevi heal most readily when treated with radium. 2. The superficial capillary nevi heal best after treatment with the blue light rays of the Kromayer lamp. The deeper lying vascular nevi that extend through the entire cutis can be rendered less conspicuous but are not cured by treatment with light rays, with roentgen rays or with radium rays. 3. The superficial small nevi can be treated by a number of various remedies and also by roentgen rays or radium. Extensive superficial as well as deeper lying nevi, for which neither operation nor other therapeutic measures are advisable, can be cured without danger by radium and roentgen therapy.

Klinische Wochenschrift, Berlin

11: 1249-1288 (July 23) 1932. Partial Index

Results of Research on Thallium and Their Practical Significance. A. Buschke and B. Peiser.—p. 1249.
Influence of Change in Posture, Especially of Elevation of Legs, on Minute Volume of Heart in Healthy Persons and in Patients. P. Bielschowsky.—p. 1252.
*Diagnosis of Coronary Sclerosis. E. Zadek.—p. 1255.
Presence in Cerebrospinal Fluid of Substances Influencing Water and Sodium Chloride Economy During Disorders in Hypophyseal System. K. Grassheim.—p. 1257.
Necrosis of Extremities in Polycythemia Vera. F. Becker.—p. 1260.
Action of Parathyroids. E. Herzfeld and A. Frieder.—p. 1262.
*Hitherto Unknown Familial Anomaly of Leukocytes. G. J. Huët. —p. 1264.
Influence of Anterior Lobe of Hypophysis on Gallbladder. F. Fischer. —p. 1266.
Chemistry of Feces and Intestinal Function of Nurslings and of Small Children on Apple Diet. T. Baumann.—p. 1267.
Method of Preparation of Thyrotropically Active Extracts from Anterior Lobe of Hypophysis. A. Loeser.—p. 1271.
Viscerogalvanic Reaction. E. A. Spiegel and M. G. Wohl.—p. 1272.
Fatal Poisoning with Acriflavine Hydrochloride with Aspects of Necrosing Nephrosis. M. Kartagener and F. Ramel.—p. 1273.

Diagnosis of Coronary Sclerosis.—In comparing his anatomic, clinico-electrocardiographic and roentgenologic observations, Zadek found that in more than 75 per cent of cases coronary sclerosis is localized in the descending branch of the left coronary artery, the closure of which leads to infarction or to the formation of an aneurysm in the region of the apex of the heart. The electrocardiogram frequently shows the so-called coronary configuration of the final deflection, which in cases in which the clinical symptoms are not clear decides the diagnosis. Other electrocardiographic changes and arrhythmias are of far less significance. The rare disturbances in the atrioventricular conduction may indicate a disturbance in the right coronary artery. As especially significant the author considers the hitherto unreported fact that an aneurysm of the cardiac apex appears in the roentgenogram usually as a rounding and a dilatation of the cardiac apex, and that this symptom, after

differential diagnostic exclusion of an insufficiency of the aortic valve, and after exclusion of decompensated hypertonus, and in the presence of an etiologically nuclear weakness of the cardiac muscle, constitutes a significant sign of a coronary disturbance.

Hitherto Unknown Familial Anomaly of Leukocytes.—Huët observed three families in which several members present a hitherto unknown hereditary anomaly of the leukocytes. The anomaly is characterized by: (1) a marked deviation to the left, with a still greater increase in the number of staff cells under the influence of infections; (2) a typical form of staff nuclear leukocytes; (3) a typical behavior of the leukocytes with segmented nucleus, which is noticeable in the neutrophil, in the eosinophil and in the basophil cells. The anomaly could be traced through three generations. It is transmitted from the mother to the children. So far only one case has been observed in which one generation was skipped, that is, according to present knowledge there are no latent carriers. The anomaly occurs in men as well as in women.

Wiener klinische Wochenschrift, Vienna

45: 929-956 (July 22) 1932

Clinical Aspects of Paratyphoid in Human Beings. A. Luger.—p. 929.
Short Wave Irradiation of Brain in Dementia Paralytica. O. Kauders, P. Liebesny and F. Finaly.—p. 935.
Anthrax in Human Beings in Austria. A. Philadelphy.—p. 938.
*Asymmetry of Female Breasts in Pathologic Changes in Parietal Pleura. A. Sattler.—p. 942.
Thrombo-Embolism. P. Neuda.—p. 947.
Does Diabetic Child Receiving Insulin Treatment Require Dietary Therapy? R. Wagner.—p. 949.

Asymmetry of Female Breasts in Pathologic Changes in Parietal Pleura.—Sattler points out that asymmetry of the female breasts may sometimes be caused by pathologic processes in the thorax. Either an enlarged or an atrophied mamma may be on the diseased side. In explaining the pathogenesis of these phenomena the author agrees with Sorgo, who observed either greater succulence or greater adherence in the skin and in the subcutaneous connective tissue on the anterior wall of the thorax in patients with pathologic changes in the parietal pleura. These changes in the skin are explained to be the result of stagnation in the lymph channels, which in turn are caused by the pathologic conditions in the parietal pleura. Observation reveals a parallelism between the manifestations on the skin of the chest and on the mamma, so that the abnormal condition in the parietal pleura must also be considered the etiologic factor of the change in the breast.

Zeitschrift für urologische Chirurgie, Berlin

35: 1-168 (June 22) 1932

*Cystic Dilatation of Vesical Termination of Ureter: Physiopathology of Upper Urinary Passage. V. Goldberg.—p. 1.
Surgery of Renal Tuberculosis with Especial Emphasis on Treatment of Contracted Bladder. O. Orth.—p. 26.
*Physiology and Pathology of Dynamics of Ureter in Elimination Urography with Especial Consideration of Disorders of Adnexa. W. Heckenbach.—p. 34.
Pathology and Clinical Aspects of Urolithiasis. W. Grossmann.—p. 78.
Solitary Cysts of Kidney. E. Damm.—p. 102.
Clinical Aspects of Chronic Inflammatory Perinephrial Disturbances (Perinephritis).—p. 114.
Calculus Formation in Congenital Dystopic Kidneys. M. Laszczower.—p. 136.
Pathogenesis and Therapy of Ureterocele. B. Schmuckler.—p. 149.
Renal Tuberculosis in Boy Aged Two Years and Four Months: Surgical Treatment. A. Takahashi and T. Ueda.—p. 155.
Ureteral Stenoses: Necessity for Precaution in Their Roentgenologic Diagnosis. A. Rothschild.—p. 161.

Cystic Dilatation of Vesical Termination of Ureter: Physiopathology of Upper Urinary Passage.—In reviewing the literature on cystic dilatation of the vesical termination of the ureter, Goldberg found 300 cases. His own observations were made on twenty-two cases, of which he gives a tabular report. The incidence of cystic dilatation he estimates at about four in every thousand cases of urologic disorders. His treatise deals particularly with the influence of cystic dilatation on the upper urinary passages, and he calls attention to its frequent concurrence with malformations of the urogenital system, with urinary infections and with urolithiasis. In discussing the roentgenologic examination, he states that general roentgen examination is made to detect concrements, and the elimination urogram reveals not only the morphology but also the function. He disagrees with the opinion of some investigators who maintain that the normal ureter is usually filled in intravenous urography whereas the diseased ureter is only partially filled, for in thousands of urograms he noticed the reverse. He shows roentgenograms of the different changes in the upper urinary tract; namely, dilatation of the vesical termination, dilatation of the entire ureter and atony. He calls attention particularly to the serpentine outline of the ureter, in which the "head of the snake," representing the cystic dilatation, reaches into the bladder. He also shows how the urinary stasis resulting from the cystic dilatation causes pathologic changes in the urinary tract. The treatment should therefore prevent or counteract the urinary stasis by removing the cause; that is, the cystic dilatation. The method may be endovesical or transvesical. The author evaluates several methods, such as endovesical slitting of the ostium, thermocoagulation, dorsal opening of the bladder, and circumcision. All these methods have certain disadvantages, such as stenosis or reflux. To avoid stricture and reflux, the author recommends von Lichtenberg's method. Involvement of the upper urinary passages may necessitate a primary intervention there. As in a two-stage prostatectomy, the removal of the primary cause may have to be preceded by nephrolysis, nephrostomy, decapsulation or nephropexy.

Dynamics of Ureter in Elimination Urography.—Heckenbach shows that elimination urography can reveal the course of the dynamics of the upper urinary passages, as well as their disturbances, only when it is employed without artificial stasis. Normally a continuous visualization of the ureter cannot be expected, and if it is revealed a motility disturbance may be assumed, which, however, need not be local but may also be caused by distant infectious toxic processes. If the peristalsis is reduced, hypotony is probable; but, just as in hypertony, the signs are not sufficiently distinct to make possible an exact roentgenologic differentiation. As yet the knowledge is not sufficient to differentiate a dilatation that is due to functional disturbances from one that is the result of motility disturbances. For this reason not every dilatation in elimination urography can be considered as pathologic. The designation ureteral atony has as yet no uniformity in its interpretation. It should be applied only to cases in which the contraction capacity is entirely absent, and observations on characteristic cases have revealed that such a condition is only rarely permanent. The author also shows that disorders of the male or of the female adnexa are of great significance for disturbances of the ureters. The influence of the adnexal disturbances on the upper urinary passages is so characteristic that for one who has sufficient experience it is possible to detect in the urogram certain indications about their nature.

Zentralblatt für Gynäkologie, Leipzig

56: 1745-1808 (July 16) 1932

*Pathologic Anatomy and Clinical Aspects of Endometriosis of Uterine Tube. L. Seitz.—p. 1746.
Injuries of Fetus in Criminal Abortions. W. Wladika.—p. 1766.
Roentgenoscopy in Obstetrics. S. Schereschewsky.—p. 1771.
When Is the Classic Cesarean Section Superior to Modern Cesarean Section of Uterus in Situ? A. Richter.—p. 1780.
Biochemical Investigations on Cervical Secretion. A. W. Hochloff.—p. 1785.

Pathologic Anatomy and Clinical Aspects of Endometriosis of Uterine Tube.—On the basis of observations, Seitz concludes that if endometrioid tissue is present in the uterine tube, tubal menstruation is the result. In course of time this leads to closure of the abdominal end of the tube. If during every period only small amounts of blood are excreted, a chocolate or tar tube develops gradually. If profuse bleeding sets in after closure of the tube, acute formation of a hematosalpinx with more or less fulminant manifestations is the result. These severe symptoms are like those that are observed in tubal rupture, in acute adnexitis or in torsion of the pedicle. If the quantity of cycle hormones is small and the functional transformation of the glandular epithelium is slight, as the author observed in a patient with oligomenorrhea and with increasing obesity, it is possible that instead of the pure blood there is a serous or serosanguineous secretion. In this event not a chocolate or tar tube is formed but rather a hydrohematosalpinx. The same applies to heterotopic cysts of the ovaries. Not only

tar and chocolate cyst of the ovary but also cysts with serosanguineous contents may be caused by heterotopic proliferations. Yet in these serosanguineous accumulations, just as in the typical chocolate cysts or tubes, the characteristic clinical symptoms are the gradually increasing dysmenorrheal disorders and signs of peritoneal irritation.

Jurnal Nevropathologii i Psikhiatrii, Moscow

No. 8, 1-127, 1931

Psychoneurology and Personnel Work Among Normal and Physically and Mentally Deficient Individuals. I. E. Madora.—p. 11.
Social-Emotional Element in Social-Occupational Therapy. N. I. Gerasimov.—p. 14.
Relationship Between Muscle Tonus and Chronaxia. M. B. Krol, D. A. Markov and N. G. Kantor.—p. 19.
Experimental-Clinical Aspect of Neurotization. Z. I. Finkel.—p. 24.
Trauma as Cause of Parkinsonian Syndrome. A. E. Kulkov.—p. 32.
*Rôle of Malaria in Genesis and Structure of Psychoneuroses. A. A. Perelman.—p. 37.
Instance of Psychic Panic Among Fishermen Following Supposed Poisoning of Some of Them. N. I. Sklyar, A. N. Ivanov and V. I. Cheryapkin.—p. 47.
Study of Capillary Circulatory System in Cyclophrenia. N. A. Shevelev.—p. 53.
Unsuggested Changes in Handwriting During Hypnotic States. R. V. Volevich.—p. 61.
Review of Medical Treatment for Various Psychic Disturbances. S. Mikhalevskaya.—p. 69.
Examination of Work in Psychoneurologic Institutions of Leningrad for 1930. B. E. Maksimov.—p. 83.
Value of Encephalography and Myelography and Consideration of Iodized Poppy-Seed Oil as Contrast Medium. Z. L. Lurye.—p. 96.

Rôle of Malaria in Genesis and Structure of Psychoneuroses.—Perelman states that psychic disturbances in connection with malarial infection are not frequent. When malarial infection has a long drawn out course, it may overtax the system and call forth various disturbances of the nervous system. Malarial psychoneuroses occur in tropical and subtropical regions in which malaria is endemic, but other regions are not excluded. Although chronicity most usually calls forth psychoneurosis, psychoses may also occur during acute forms of malaria; although the mature worker is most often affected, malarial psychoneuroses can appear in both young and old. Generally, the incidence of psychoneuroses is dependent on those social factors which tend to lower the somatopsychic resistance of the individual and predispose the body to toxico-infectious action. Malaria may be the primary or the secondary or exciting cause of psychoneurosis. In the first instance, malaria is a pathogenic factor with resultant asthenic and emotional-hyperesthetic manifestations, in both of which the endocrine-sympathetic apparatus plays a part; in the second instance, malaria is a pathoplastic determinant in which the constitutional predisposition of the individual is the important factor. It is important to distinguish between malarial psychoneurosis, and psychoneurosis during the course of malaria. Pathoplastic reactions due to malaria call forth psychoneuroses of an hysterical type and especially those that make up a schizoid personality. The prognosis for neuromalaria depends on the malaria itself; the prognosis for constitutional psychoneurosis called forth during the course of malaria is not so certain. The primary therapeutic agent is quinine; adjuvant treatment may include preparations of arsenic and iron, diet, physical therapy, psychotherapy and possibly a change of climate.

Jurnal Rannemu Detskomu Vozrastu, Moscow

12: 153-204 (No. 5) 1932

Blood Groups of Children and Their Relation to Several Hereditary and Constitutional Factors. Kh. L. Mariupolskaya.—p. 153.
*Experimental Study of Influence of Small Doses of Atropine and Quinine on Production of Immune Bodies. M. M. Priselkov.—p. 162.
Methods of Dealing with Diphtheria Carriers. E. K. Mieserova.—p. 169.
Acidosis in Tuberculosis of Early Childhood. I. V. Tsimbler and M. I. Neishtadt.—p. 175.
Clinical Aspect of Tuberculosis of Early Childhood. A. I. Balander, E. M. Plyam and A. M. Kropachev.—p. 183.
Study of Epidemic of Dysentery in Children in City of Stalino, Summer of 1930. E. I. Rikhter.—p. 189.

Influence of Atropine and Quinine on Production of Immune Bodies.—Priselkov agrees with other investigators who consider that the production of antibodies is a cellular function and particularly the function of the endothelial system. In lowering the cellular reaction against antigens, quinine and atropine can lower the capacity of the cells to absorb bacteria and their toxins and in that way lower the body immunity. The author states that his experimental studies offer proof that atropine and quinine lower the antibody content of the blood; atropine influences the agglutinin content, whereas quinine influences both the agglutinin and the precipitin content. Neither medicament influences the hemolysin titer of the blood. The two substances do not change the character of the exudate or the course of the infectious process.

Hospitalstidende, Copenhagen

75: 845-872 (June 23) 1932

Pneumothorax Treatment of Nontuberculous Pulmonary Caverns. J. N. Lorenzen.—p. 845.
*Cauterization of Stomach by Acid with Subsequent Development of Pernicious Anemia. C. C. Fleischer-Hansen.—p. 855.
Cerebral Tumor with Destruction of Cranium (Meningeal Endothelioma): Disappearance After Roentgen Treatment. J. Nordentoft.—p. 863.

Cauterization of Stomach by Acid with Development of Pernicious Anemia.—Fleischer-Hansen considers this case, in a woman originally admitted for treatment thirty-six hours after accidentally drinking about half a cup of nitric acid, of interest (1) because of the exceedingly grave gastric lesion with stricture formation of almost the entire pyloric portion of the stomach, while the esophagus was almost uninjured, and (2) especially because of the indication it presumably affords of the significance of the gastric function in the origin of pernicious anemia. Anterior antecolic gastro-enterostomy (Wölfler) with entero-anastomosis (Braun) was well borne.

Norsk Magasin for Lægevidenskapen, Oslo

93: 713-816 (July) 1932

*Angina Pectoris. N. B. Koppang.—p. 713.
*Cardiac Infarct, Particularly from Clinical Point of View. A. Jervell.—p. 732.
Psychic and Neurologic Changes After Hypoglycemic Coma in Case of Schizophrenia. H. Torp.—p. 760.
*Variations in Reaction and Salt Content of Urine Independent of Intake of Food. R. Nicolaysen.—p. 766.
*Variations in Blood Calcium Picture in Man During Fasting. R. Nicolaysen.—p. 774.
*Renal Arrest of Growth: Renal Infantilism, Renal Dwarf Growth, Renal Rickets. A. Sundal.—p. 777.
Congenital Idiopathic Dilatation of Esophagus in Puppy. P. Treider.—p. 785.

Angina Pectoris.—Koppang discusses the collaterals of the coronary circulation and the importance of the electrocardiogram in the diagnosis of myocarditis, and describes eight of the sixty cases of angina pectoris in which electrocardiography has been done by him.

Cardiac Infarct.—Jervell presents his clinical observations in fifteen cases of infarct of the heart, and on the basis of these and of the literature sets up four clinical types of infarct of the heart; namely, (1) the anginoid, (2) the abdominal, (3) the pulmonary, and (4) the atypical cases. He emphasizes the peculiar change, in cardiac infarct, in the appearance of the electrocardiogram, which can be seen in the course of a short time, occasionally from one day to another. This relation, which he illustrates by curves, is considered a diagnostically important sign. His other electrocardiographic results agreed in the main with changes regarded as characteristic by Pardee, Parkinson and Bedford, and others.

Variations in Reaction and Salt Content of Urine Independent of Intake of Food.—During the fasting alkaline tide in the urine, Nicolaysen found a considerable rise in the chloride concentration with a simultaneous increase in the sodium and potassium concentration. Independent of these variations, a fall occurred in the calcium and magnesium values.

Variations in Blood Calcium Picture in Man During Fasting.—Nicolaysen states that the fasting blood calcium may remain constant or may vary up to 2 mg. per hundred cubic centimeters in the same person during the course of the day.

Renal Arrest of Growth.—In Sundal's patient, a boy, aged 12, with congenital malformation in the urinary tract, there is pyuria (bilateral hydronephrosis) with secondary involvement of the kidneys manifested by polyuria, hyposthenuria and azotemia, but no hypertension. There are no signs of rickets. The boy's height is 122 cm.; the bodily proportions are normal. Renal rickets, renal infantilism and renal dwarf growth are reviewed.